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## **Five-Year Review Report**

### **First Five-Year Review Report for Naval Station Great Lakes Great Lakes, Illinois**

**March 2016**

**PREPARED JOINTLY BY:**



**RESOLUTION CONSULTANTS**  
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# Five-Year Review Report

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for  
Naval Station Great Lakes  
Great Lakes, Illinois  
July 2018  
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Approved by: CDR Carl V. Kirar  
Public Works Officer  
Naval Station Great Lakes

Date:

<sup>6/25</sup>  
16 JUL 18

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## List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
AST	aboveground storage tank
bgs	below grade surface
CERCLA	Comprehensive Environment Response Compensation and Liability Act
COC	containments of concern
COPC	chemicals of potential concern
CVOC	chlorinated volatile organic compound
DCE	dichloroethylene
EE/CA	Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
ERH	electrical resistance heating
FS	feasibility study
GLBJ	Great Lakes Bulletin Journal
GRO	Groundwater Remediation Objectives
HDPE	high density polyethylene
HHRA	human health risk assessment
HI	hazard index
IAC	Illinois Administrative Code
LUC	Land Use Control
LUCMOA	Land Use Control Memorandum of Agreement
LUCRD	Land Use Control Remedial Design
MCL	maximum contaminant levels
mg/kg	milligrams per kilograms
NAVFAC	Naval Facilities Engineering Command
Navy	United States Navy
NCP	National Contingency Plan
NIRIS	Naval Installation Restoration Information System
NSGL	Naval Station Great Lakes
O&M	operation and maintenance
PCB	polychlorinated biphenyls
PCE	tetrachloroethene
PAH	polyaromatic hydrocarbons
PRG	preliminary remediation goals
QA/QC	quality assurance/ quality control

## List of Acronyms (continued)

RA	remedial action
RAO	remedial action objectives
RI	remedial investigation
RACR	Remedial Action Completion Report
RCRA	Resources Conservation and Recovery Act
ROD	Record of Decision
RSL	Regional Screening Levels
SERA	Screening-Level Ecological Risk Assessment
SRO	Soil Remediation Objectives
SVOC	semivolatile organic compounds
TACO	Tiered Approach to Corrective Action Objectives
TCL	target compound list
TDS	total dissolved solids
TtNUS	Tetra Tech NUS, Inc.
UU/UE	unlimited use and unrestricted exposure
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compounds

## Executive Summary

The United States Navy (Navy) has completed the first five-year review for Naval Station Great Lakes (NSGL) in Great Lakes, Illinois. This five-year review evaluates whether the remedies in place at six sites at NSGL protect human health and the environment. The six sites that were evaluated are:

- Site 22 – Former Building 105, Old Dry Cleaning Facility
- Site 3 – Supplside Landfill
- Site 2 – Forrestal Landfill
- Site 1 – Golf Course Landfill
- Site 4 – Former Fire Fighting Training Unit
- Site 19 - Small Arms Range 910

This evaluation included the following tasks.

1. Reviewed operation and maintenance (O&M) inspection reports and groundwater monitoring reports for each site, and assessed the remedy's effectiveness.
2. Reviewed decision documents for each site, and determined whether cleanup criteria and Applicable or Relevant and Appropriate Requirements (ARARs) are appropriate.
3. Inspected the sites.
4. Conducted interviews and coordinated with Five-Year Review team members.
5. Assessed the remedies' effectiveness and protectiveness.
6. Prepared the report.

Results from this five-year review indicate that the remedies in place at NSGL sites protect human health and environment. The protectiveness of the remedy for each site is discussed below. Some minor issues that don't affect the protectiveness of each remedy were identified and are also mentioned below along with the recommended actions that should be taken before the next five-year review period.

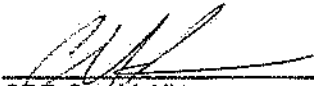
## Five-Year Review Summary

SITE IDENTIFICATION		
<b>Site Name (from WasteLAN):</b> Various Sites at NSGL: Site 1 - Golf Course Landfill; Site 2 - Supplyside Landfill; Site 3 - Forrestal Landfill; Site 4 - Former Fire Fighting Training Unit; Site 19 - Small Arms Range 910; and Site 22 - Former Building 105, Old Dry Cleaning Facility		
<b>EPA ID (from WasteLAN):</b> IL7170024577		
<b>Region:</b> 5	<b>State:</b> IL	<b>City/County:</b> Great Lakes/Lake County
SITE STATUS		
<b>NPL status:</b> Non-NPL		
<b>Remediation Status (choose all that apply):</b> Operating and Complete		
<b>Multiple OUs?*</b> Yes	<b>Number of Sites/OUs:</b> 6	<b>Construction Completion Date:</b> Varies
<b>Has site been put into reuse?</b> Yes		
REVIEW STATUS		
<b>Lead Agency:</b> Other Federal Agency – Naval Facilities Engineering Command, MIDLANT (NAVFAC MIDLANT)		
<b>Author Name:</b> Maritza Montegross		
<b>Author Title:</b> Navy Remedial Project Manager	<b>Author affiliation:</b> NAVFAC MIDLANT Environmental	
<b>Review Period:</b> 9/1/2012 to 9/30/2015		
<b>Date(s) of Site Inspection:</b> 9/20/2012 and 8/15/2013		
<b>Type of Review:</b> Non-NPL Remedial Action Site		
<b>Review Number:</b> 1 (first)		
<b>Triggering action:</b> RA Construction Completion/ROD signed		
<b>Triggering Action Date (from WasteLAN):</b> August 2008		
<b>Due Date (five years after triggering action date):</b> August 2013		

\* "OU" refers to Operable Unit as defined by United States Environmental Protection Agency (USEPA)

ISSUES, RECOMMENDATIONS & FOLLOW-UP ACTIONS
<p>No issues were identified at any of the six sites that could affect current or future protectiveness, but some minor issues were discovered that would be good to address before the next five-year review period; these are:</p> <p>Site 22 – Former Building 105, Old Dry Cleaning Facility</p> <ul style="list-style-type: none"> <li>Monitoring wells from ERH treatability study are still present; recommend these be properly abandoned.</li> </ul> <p>Site 3 – Supplyside Landfill</p> <ul style="list-style-type: none"> <li>Bare area found on landfill cover; recommend to seed &amp; mulch area to prevent soil cover erosion.</li> <li>Two gas vents not spinning; recommend to check, fix &amp; ensure all vents are functioning properly.</li> <li>30 ft by 20 ft depression/settlement found; recommend checking &amp; repairing cap as needed.</li> </ul> <p>Site 2 – Forrestal Landfill</p> <ul style="list-style-type: none"> <li>Bare area found on landfill cover; recommend to seed &amp; mulch area to prevent soil cover erosion.</li> <li>One gas vent not spinning; recommend to check, fix &amp; ensure all vents are functioning properly.</li> </ul> <p>Site 1 – Golf Course Landfill and Site 4 – Former Fire Fighting Training Unit</p> <ul style="list-style-type: none"> <li>Revise the Operating and Maintenance Plan to require the Naval Station Great Lakes or MidLANT Project Manager conduct the inspections and prepare reports.</li> </ul> <p>Site 19 - Small Arms Range 910</p> <ul style="list-style-type: none"> <li>Wells from the investigation are still present; recommend these be properly abandoned</li> </ul>

## Five-Year Review Summary (continued)

PROTECTIVENESS STATEMENT(S)	
Site 22 – Former Building 105, Old Dry Cleaning Facility	<i>Protectiveness Determination: Protective</i>
The implemented remedy (liner & asphalt cover) at Site 22 is protective of human health and the environment. LUCs are in place to prevent unacceptable exposures (e.g., residential land use, groundwater use).	
Site 3 – Supplside Landfill	<i>Protectiveness Determination: Protective</i>
The implemented remedy (soil cover) at Site 3 is protective of human health and the environment. Groundwater is being monitored and LUCs are in place to prevent unacceptable exposures (e.g., residential land use, groundwater use).	
Site 2 – Forrestal Landfill	<i>Protectiveness Determination: Protective</i>
The implemented remedy (soil cover) at Site 2 is protective of human health and the environment. Groundwater is being monitored and LUCs are in place to prevent unacceptable exposures (e.g., residential land use, groundwater use).	
Site 1 – Golf Course Landfill	<i>Protectiveness Determination: Protective</i>
The implemented remedy (soil cover) at Site 1 is protective of human health and the environment. Groundwater is being monitored and LUCs are in place to prevent unacceptable exposures (e.g., residential land use, groundwater use).	
Site 4 – Fire Fighting Training Unit	<i>Protectiveness Determination: Protective</i>
The implemented remedy (soil cover) at Site 4 is protective of human health and the environment. Groundwater is being monitored and LUCs are in place to prevent unacceptable exposures (e.g., residential land use, groundwater use).	
Site 19 – Small Arms Range 910	<i>Protectiveness Determination: Protective</i>
The implemented remedy (LUCs) at Site 19 is protective of human health and the environment. LUCs are in place to prevent unacceptable exposures (e.g., residential land use, groundwater use).	
<p><b>Other Comments:</b></p> <p>This Five-Year Review shows that the Navy is meeting the requirements of the RODs for the sites at NSGL.</p> <p><b>Next Review:</b></p> <p>The next Five-Year Review of NSGL will be completed by September 2019.</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;">  <div style="border-top: 1px solid black; padding-top: 2px;"> CDR Carl V. Kirar  Public Works Officer  Naval Station Great Lakes </div> </div> <div style="width: 45%; text-align: center;"> <div style="border-top: 1px solid black; padding-top: 2px; margin-bottom: 5px;">16 JUL 19</div> Date </div> </div>	

## 1.0 Introduction

This is the first five-year review for six Comprehensive Environment Response Compensation and Liability Act (CERCLA) sites at Naval Station Great Lakes (NSGL) in Great Lakes, Illinois (see Figures 1-1 and 1-2). On behalf of the Naval Facilities Engineering Command (NAVFAC) and in conjunction with the Illinois Environmental Protection Agency (EPA), Resolution Consultants, under contract N62470-11-D-8013, CTO F275, has completed this review. IRP Sites at NSGL include:

Status of IRP Sites – Table 1

Site	Current Status	Basis for Action	Evaluated in this Report
Site 22 - Former Building 105, Old Dry Cleaning Facility	LUCs	VOCs in soil and groundwater	Yes
Site 3 – Supplyside Landfill	LTM, LUCs	Waste in place,	Yes
Site 2 – Forrestal Landfill	LTM, LUCs	Waste in place,	Yes
Site 1 – Golf Course Landfill	LTM, LUCs	Waste in place,	Yes
Site 4 – Former Fire Fighting Training Unit	LTM, LUCs	VOCs and PAHs in soil and groundwater	Yes
Site 19 – Small Arms Range 910	LUCs	PAHs and metals in soil	Yes
Site 5 – Transformer Storage Boneyard	RI/FS	PAHs and metals in soil, carbon tetrachloride and barium in groundwater	No
Site 9 – Camp Moffett Ravine Fill Area	RI/FS	PAHs and metals in soil, metals in groundwater	No
Site 12 - Harbor Dredge Spoil Area	RI/FS	PAHs, pesticides, and metals in soil, metals in groundwater	No
Site 17 - OU1 – Pettibone Creek	NFA ROD	PAHs and metals in sediment	No
Site 17 - OU2 – Boat Basin	RI/FS	PCBs and PAHs in sediment	No
Site 21 - Buildings 1517/1506 Area	RI/FS	PAHs and metals in soil, pentachlorophenol in groundwater	No
Site 24 - Panhandle Fill Area	RI/FS	Waste in place asbestos	No
Site 25 – Camp Moffett South Fill Area	RI/FS	Waste in place, asbestos	No

This five-year review is required by statute. The five-year review is required because remedial actions have taken place resulting in hazardous substances, pollutants, or contaminants to remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE). The review includes remedial activities conducted through January 2014.

This five-year review is being conducted in accordance with U.S. EPA guidance for sites in the Navy's Environmental Installation Restoration Program at Naval Station Great Lakes. These sites have Records of Decision (RODs) that identify the selected remedial action, have Land Use Controls (LUCs) in place following the submittal of the ROD, or are closed landfills. This five-year review did not include Site 17, OU1 because five-year reviews are not required when the selected remedial action in the ROD is No Further Action (NFA) and there have been no changes in the site conditions and the factors contributing to the assumptions underlying the NFA decision. The sites that are not evaluated in this five-year review identified in Table 1 were not included because these sites are being investigated [Remedial Investigation (RI)/Feasibility Study (FS)], no ROD has been prepared that identifies the selected remedial action, and no remedial actions have been conducted at these sites. Former underground storage tank sites that have LUCs in place are not included in this five-year review.

The purpose of a five-year review is to evaluate the implementation and performance of the remedies at the sites to determine whether the remedy at a site is protective of human health and the environment. The methods, findings and conclusions of the review are included in the report.

In addition, this report identifies issues found during the review and provides recommendations to address them.

This five-year review was conducted in accordance with the Navy's *Policy for Conducting Five-Year Reviews* of June 2011, the United States Environmental Protection Agency's (USEPA) *Comprehensive Five-Year Review Guidance* of June 2001 and the Navy's *Toolkit for Preparing Five-Year Reviews* of April 2013. These ensure that this five-year review has been prepared pursuant to CERCLA §121 and the National Contingency Plan (NCP) [40 Code of Federal Regulations (CFR) Part 300].

CERCLA §121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency has interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less than every five years after the initiation of the selected remedial action.*

For federal facility sites under the jurisdiction, custody, or control of the Department of Defense, Executive Order 12580 relieves the U.S. EPA of this responsibility and delegates the responsibility to the Department of Defense. The Navy is the lead agency responsible for this Five-Year Review at NSGL. As the lead agency, the Navy is responsible for conducting the Five-Year Review, preparing the associated report, and ensuring that recommendations and follow-up actions identified during five-year reviews are completed. USEPA guidance states that Federal agencies or departments should conduct five-year reviews for all CERCLA non-NPL sites. It is USEPA's expectation that Federal agencies or departments will conduct five-year reviews as a matter of policy at sites that would be subject to reviews if they were on the NPL. U. S. EPA retains authority to concur with the lead federal agency's protectiveness determinations to ensure protection of human health and the environment, consistent with U.S EPA's statutory and regulatory authorities, or U. S. EPA may provide independent findings.

Also, at sites where states have an active role, they should be provided with adequate opportunity to participate in the five-year review process and review the Five-Year Review document. Illinois EPA is a supporting agency that will work with the Navy.

## **1.1 Five-Year Review Process Team Members**

The five-year review was completed by the following team members:

- Terese Van Donsel – Navy Remedial Project Manager, Naval Station Great Lakes
- Maritza Montegross – Navy Remedial Project Manager, NAVFAC MIDLANT
- Howard Hickey – Restoration Product Line Coordinator, Naval Station Great Lakes
- Brian Conrath – Project Manager, Illinois EPA
- Ken Brown – CTO Manager, Resolution Consultants
- Shannon Flanagan – Project Engineer, Resolution Consultants
- Nicole Marcell – Project Hydrogeologist, Resolution Consultants

## **1.2 Five-Year Review Tasks**

The five-year review included the following tasks:

- Preparing public notice of five-year review.
- Reviewing historical documents related to NSGL, including documents specific to each LUC area or site.
- Reviewing monitoring reports and data, O&M data, and annual inspection reports for each LUC area or site.
- Conducting site inspections.
- Conducting interviews and coordinating with the NAVFAC Five-Year Review team members.
- Assessing effectiveness and protectiveness of remedies (including LUCs) on a site-specific basis.
- Preparing a Five-Year Review report.

Recent groundwater laboratory analytical results are provided in Appendix A.

## **1.3 Community Notification**

The affected community was notified of the five-year review through publication of a notice in the Great Lakes Bulletin Journal (GLBJ). Publication of the notice was made in the December 7, 2012 edition of the GLBJ. A certificate of publication for the public notice is provided as Appendix B of this document.

## **1.4 Next Review**

The next five-year review for the CERCLA sites at the NSGL is required to be completed and signed in September 2021 five years from when this five-year review is dated.

## **1.5 NSGL Background**

NSGL is located in Lake County, Illinois along the shore of Lake Michigan. It is bounded on the north by the City of North Chicago, on the south by the Veterans Administration Hospital and Shore Acres Golf Course and Country Club, on the east by Lake Michigan, and on the west by U.S. Route 41 (Skokie Highway) (Tetra Tech, 2008). It includes over 1,100 buildings on over 1,202 acres.

NSGL has served as a training facility for the Navy since 1911. It administers base operations and provides facilities and related support to training activities (including the Navy's only boot camp) and a variety of other military commands located on base.

NSGL is made of at least eight discontinuous areas of land separated by public areas/roadways. Base-wide access is restricted, but once inside the base, access to most sites is not restricted. A variety of land uses currently surround NSGL. Along the northern boundary of the base are the most highly urbanized and industrial areas. Much of the land beyond the northwestern site boundary comprises unincorporated lands of Lake County and is vacant except for scattered retail and residential properties. Adjacent to the western boundary are primarily industrial properties, and along the southern boundary is a mixture of public open space and residential land. The eastern

edge of the base is adjacent to Lake Michigan and includes a harbor in the vicinity of the boathouse.

The soil at Site 1 include Pella silty clay loam, Morley silt loam, Ashkum silty clay loam, Grays and Markham silt loams, Zurich and Morley silt loams, and Made Land. The majority of soil at NSGL have been mapped as Made Land soil that consist of areas of manmade cuts and fills and areas associated with ravines, as mapped by the Natural Resources Conservation Service. In general, geologic materials in descending order include 100 to 150 feet of fine-grained till, 10 to 50 feet of sand and gravel, 10 to 50 feet of fine-grained till, and Silurian-age dolomitic bedrock. The geology of the county is described as unconsolidated glacial till overlying Silurian-age dolomite. The geologic units encountered at NSGL include aeolian and lacustrine deposits, glacial till, and bedrock. Bedrock consists of Silurian Niagran and Alexandrian dolomite, the lowermost geologic unit encountered at NSGL. The interface between the bedrock surface and overlying till consists of 1 to 15 feet of broken bedrock (dolomite), gravel, sand, and coarser material. (Tetra Tech NUS, Inc, [TtNUS], March 2008).

Five major, water-bearing hydrogeologic units are in the vicinity of NSGL. The two uppermost units, the sand and gravel of the glacial drift and the Silurian dolomite, form a shallow aquifer system. Water is recharged to this system by local rainfall. The shallow aquifer system is thin or absent in some areas, and water quality is often poor because of the presence of naturally occurring gas, oil, and hydrogen sulfide.

The remaining three aquifers occur in deep sandstone bedrock deposits separated by up to several hundred feet of confining layers consisting of dolomites and/or shales. In descending order, they are the Glenwood St. Peter Sandstone, the Ironton-Galesville Sandstone, and the Mt. Simon Sandstone. These aquifers are present throughout Lake County and typically have high yields of good quality water. The Ironton-Galesville Sandstone usually is the most dependable source. (CNE&T, 1994).

With Lake Michigan as the eastern boundary of the NSGL; the majority of the sites within the NSGL are interpreted as having a directional groundwater flow (to the east) toward Lake Michigan.

## 2.0 Site 22 – Former Building 105, Old Dry Cleaning Facility

The Site 22 Record of Decision (ROD) was signed in 2008. This five-year review of Site 22 is required by statute because hazardous substances, pollutants, or contaminants remain on site that do not allow for UU/UE. The location of Site 22 is shown on Figure 1-2 and the layout of Site 22 is shown on Figure 2-1. A focused electrical resistance heating (ERH) treatability study was implemented at Site 22 in 2006 and was successful in reducing soil contaminant concentrations. However, contaminants remain in place at concentrations exceeding criteria that allow for unrestricted use. Therefore, an engineered barrier (an impermeable liner and asphalt pavement) was installed in 2009 that prevents direct contact with residual contaminants. LUCs were implemented in 2009 to restrict future use of the site to industrial/commercial scenarios, prohibit installation of groundwater wells other than for environmental sampling, and require annual inspections of the site to ensure LUCs are continuing to be implemented. The remedy in place continues to be protective of human health and the environment.

### 2.1 Site Chronology – Table 2

The following table presents the chronology for the key events at Site 22.

Event	Date
Illinois EPA Letter with Conditions regarding Resources Conservation and Recovery Act (RCRA) Closure of 16 Hazardous Waste Container Storage Units	April 1993
Partial Closure Certification & Sampling/Inspection Report for RCRA closure	December 1993
Initial Assessment Study to identify facilities that store hazardous materials/waste and potentially contaminates sites	March 1996
RCRA Closure Plan Building 105	April 2001
Remedial Investigation (RI)/Feasibility Study (FS) complete	July 2004/January 2006
Implementation of Focused ERH Treatability Study	May 2006
Focused ERH Treatability Study Demobilization & Site Restoration	October 2006
Focused ERH Treatability Study Groundwater Sampling	March 2007
ERH Treatability Study Report	January 2008
ROD signature	August 27, 2008
Remedy in Place/Construction Complete	August 2008
Land Use Control Remedial Design & Implementation Plan	July 2009
Annual Site Inspections began	2009

## 2.2 Background

### 2.2.1 Physical Setting

Site 22 is located in the northeast area of NSGL. The northeast area of NSGL is nonresidential and is not environmentally sensitive. Site 22 is bordered on the south by Porter Avenue, on the west by

a vacant asphalt lot, on the north by Bronson Avenue, and on the east by Sampson Street. The site is illustrated in Figure 2-1.

Building 105 was a slab-on-grade structure measuring approximately 150 feet by 70 feet. The former 10,500-square foot building occupied a lot measuring approximately 250 feet by 115 feet.

### **2.2.2 Land and Resource Use**

Former Building 105 operated as a dry cleaning facility between 1939 and 1993. Volatile Organic Compounds (VOCs) may have been discharged to the sanitary and storm sewers systems during the facility operations or as a result of occasional spills. From 1993 or 1994 until February 2001, the building was used to warehouse and repair vending equipment and products. The vending machine supply and repair operations ceased in February 2001, and the building was vacant until it was demolished in March 2003 and replaced by an asphalt parking lot with a high-density polyethylene (HDPE) liner. The site is now an active, paved parking lot.

Hazardous waste/materials associated with the dry cleaning facility, typically containing tetrachloroethene (PCE), were stored inside the building between 1980 and 1987. The quantity of waste/material stored in Building 105 is unknown. According to the revised Resources Conservation and Recovery Act (RCRA) permit for the site, the maximum amount allowed to be stored at one time was 165 gallons (i.e., three 55-gallon drums). The storage area consisted of the concrete floor of the building adjoining the concrete block exterior wall along the eastern side of Building 105. There were no berms or curbs associated with the storage area. Several floor drains were located near the storage area. According to historical foundation plans, these drains were connected to the storm sewer system outside the building (TtNUS, 2004). The building foundation plans depicted two 6-inch drains under the washing machines in Building 105. The drains were connected to a grease catch basin outside the southeast corner of the building. The catch basin was approximately 5 feet by 7.5 feet by 5.5 feet deep. It included two chambers and had a 6-inch tile effluent pipe. The effluent line may have been connected to a manhole outside the building along Sampson Street and ultimately to the waste water sewer lines for NSGL (TtNUS, 2008).

Current land use of Site 22 as a parking lot is not expected to change in the foreseeable future. The parking lot currently serves personnel in the fire station (Building 106), post office (Building 112), gymnasium (Building 4), security administration (Building 6), staff barracks (Building 178), and clinic (Building 237) (TtNUS, 2008).

LUCs are currently in place at Site 22 to restrict reuse to the industrial/commercial land use scenario. The installation of wells (other than monitoring wells) at NSGL is prohibited to prevent consumption of groundwater. An engineered barrier, consisting of an impermeable liner and asphalt pavement that were installed in 2009, is also present to prevent ingestion of soil. In addition, construction activities and intrusive work of any kind at the site must be forwarded to the NAVFAC Environmental Business Line Core for review, certification, and approval in accordance with the LUC Implementation Plan and Base Master Plan. The approval process is to ensure worker safety as required under state and federal regulations.

### **2.2.3 History of Contamination**

The former dry cleaning operations conducted at Site 22 are believed to be the primary source of soil and groundwater contamination at the site. PCE was used as part of the former dry cleaning operations, and was stored in an aboveground storage tank (AST). In addition, drums containing waste PCE were stored in a RCRA storage unit located inside of Building 105. Soil and groundwater contamination can be attributed to occasional spills during facility operations,

discharges to storm sewers, and/or damaged/leaking sanitary or storm system facilities (TtNUS, 2004).

Soil and groundwater impacts were delineated through a series of phased investigations that occurred from 2001 through 2004. PCE and cis-1,2-dichloroethylene (DCE) were identified as the containments of concern (COCs) in site soil and groundwater. Impacted soil was identified to a maximum depth of 30 feet below grade surface (bgs), with the highest concentrations occurring between 7 and 20 feet bgs nearest the former grease catch basin (TtNUS, 2004). Groundwater impacts were limited to shallow depths adjacent to the former grease catch basin. The major source area was estimated to be 625 square feet in area, encompassing a volume of approximately 600 cubic yards (TtNUS, 2004).

#### **2.2.4 Initial Response**

The 2004 Remedial Investigation (RI) and Risk Assessment Report recommended implementing an Interim Remedial Action (RA) to remove or treat a hot spot of PCE-contaminated soil and groundwater in the area of the former grease catch basin that is considered a major source area (TtNUS, 2004). A Feasibility Study (FS) compared five remedial alternatives including one alternative (i.e., Alternative 5) comprised of focused ERH, limited soil excavation, off-base treatment and disposal, capping, monitoring, and implementation of LUCs (TtNUS, 2006).

The focused ERH Treatability Study began in May 2006 to reduce the average chlorinated volatile organic compound (CVOC) concentration to below 20 milligrams per kilograms (mg/kg) in soil (i.e., a 95.5 percent concentration reduction). The focused ERH system heated the soil with electricity to transfer the CVOCs from the soil and pore water to the air. The air containing the CVOCs was collected with a vapor recovery system. During operation of the ERH system, the soil temperature was greater than 200 degrees Fahrenheit throughout the treatment volume.

About 90 percent of CVOC mass (about 1,200 pounds) was removed in the vapor recovery system, and soil concentrations were reduced by 99 percent to below 20 mg/kg. VOC concentrations in pore water were reduced by 99 percent (TtNUS, 2008).

#### **2.2.5 Basis for Taking Action**

A human health risk assessment (HHRA) was completed for Site 22 before ERH implementation. It focused on CVOCs as chemicals of potential concern (COPCs) and evaluated construction workers, maintenance workers, adolescent trespassers, and hypothetical future occupational workers as well as civilian and military residents (adults and children) as potential receptors.

The HHRA concluded that COPCs posed an elevated carcinogenic and/or noncarcinogenic risk to several receptors. Elevated carcinogenic and noncarcinogenic risks to construction workers were associated with dermal contact with PCE in groundwater and inhalation of CVOCs during excavation activities. Inhalation of vapors originating from CVOC migration from soil into a building posed an elevated risk to future military and civilian residents. Inhalation of indoor air impacted with CVOCs, inhalation of outdoor air affected by CVOC migration, and ingestion of CVOC-impacted soil posed elevated risk to future residents (TtNUS, 2004).

The HHRA conducted with the data collected after the Focused ERH Treatability Study indicated that the estimated cancer risks for construction workers and future occupational workers are less than the USEPA's target risk range and the Illinois EPA goal of  $1 \times 10^{-6}$ . Cancer risks for hypothetical future residents are within the USEPA target risk range and slightly exceed the Illinois

EPA goal. Noncarcinogenic HIs for the receptors are less than the USEPA and Illinois EPA goal of 1.

## **2.3 Remedial Actions**

### **2.3.1 Remedy Selection**

After completion and consideration of the ERH implementation results, the Record of Decision (ROD) for the site was signed in August 27, 2008 (TtNUS, 2008). The remedial action objectives (RAOs) for the site were developed in the FS and include (TtNUS,2008):

- Preventing unacceptable human health risks associated with inhalation, ingestion, and dermal contact with soil containing chlorinated organic compounds at concentrations above preliminary remediation goals (PRGs) established for site.
- Preventing unacceptable health risks associated with ingestion of groundwater or future dermal contact by workers with groundwater containing chlorinated organic compounds at concentrations greater than PRGs established for site.
- Preventing further adverse impacts to groundwater due to chlorinated organics migrating from soil to groundwater.
- Comply with NSGL RCRA permit issued by the State and obtain closure for RCRA Unit SO1 (former drum storage area), including conducting remedial actions (RAs) to reduce CVOC mass in soil and groundwater.

While the ERH Treatability Study significantly reduced the mass of contaminants at the site, brought potential current and future carcinogenic risks into the USEPA risk range, and reduced potential current and future non-carcinogenic risks to acceptable levels, LUCs were deemed appropriate because of the likelihood that low-level exceedances of State of Illinois Tiered Approach to Corrective Action Objectives (TACO) criteria could still be present at the site. Therefore, the selected remedy included implementing LUCs to prevent access to residual soil contamination and to maintain the existing engineered barrier. The following LUCs were implemented to achieve objectives:

- Property Use Restriction - Site 22 does not pose a threat to human health or the environment under an industrial/commercial land use scenario. Residential use of the property is prohibited.
- Groundwater Use Restriction - The installation of groundwater wells (other than environmental evaluation or monitoring wells) is prohibited to prevent exposure to contaminated groundwater. In addition, the installation of groundwater wells (other than environmental evaluation or monitoring wells) is prohibited in all geographic areas of NSGL by NSGL Instruction 11130.1 (Ground Water Use Restrictions).
- Soil Disturbance Restriction - No excavation of soil from Site 22 is allowed without prior review of work plans by the Navy and the State. These reviews are necessary to ensure adequate worker health and safety precautions and to confirm proper management of contaminated materials.
- Maintenance of Asphalt Cap and HDPE Liner - An asphalt cap and HDPE liner are present at the site to prevent exposure to contaminated soil and infiltration of groundwater. This cover will be inspected and maintained.

### **2.3.2 Remedy Implementation**

Because the active portion of the selected remedy was sufficiently addressed by the pre-ROD ERH Treatability Study, remedy implementation was limited to development of the language for the LUC restrictions and instituting a mechanism for reliably enacting the controls identified above in Section 2.3.1. In 2009 the Navy prepared a LUC Remedial Design (LUCRD) to clearly delineate the institutional controls identified in the ROD. The Illinois EPA reviewed and concurred with the document. The LUC descriptions were then placed in the Navy's LUC Tracker database which is accessible through the Naval Installation Restoration Information System (NIRIS).

### **2.3.3 System Operations/O&M**

The implemented remedy does not require system operation and maintenance (O&M). The area is an active parking lot and the integrity of the asphalt pavement cover is maintained by the Great Lakes Public Works Center. To prevent groundwater use in this area, no wells (other than environmental monitoring wells) can be constructed at the site. Site reuse is restricted to an industrial/commercial land use scenario under which the site does not pose a threat to human health or the environment. In accordance with the LUC Implementation Plan that is part of the LUC Memorandum of Agreement (MOA) between Illinois EPA, USEPA, and Navy dated 1 June 2005, annual inspections of Site 22 are required. Annual site inspections have been completed since 2010 with no significant issues identified. A minor issue was identified related to several monitoring wells still in place as the site that are not currently part of a monitoring program. If these wells are not needed, they should be abandoned.

## **2.4 Five-Year Review Process**

### **2.4.1 Document Review**

The following documents were reviewed for Site 22:

- Remedial Investigation and Risk Assessment Report, Site 22 – Building 105, Old Dry Cleaning Facility. NSGL, Great Lakes, Illinois. TtNUS, July 2004
- FACT SHEET Remedial Action, Site 22 – Former Building 105, Old Dry Cleaning Facility, NSGL, Illinois. Naval Training Center Great Lakes, Illinois. 2006
- Response to Illinois EPA Comments, Treatability Study Report for Site 22. TtNUS, July 31, 2007
- Electric Resistance Heating (ERH) Treatability Study Report for Site 22 Former Building 105 Old Dry Cleaning Facility. Tetra Tech NUS, January 2008
- Proposed Plan for Site 22, Former Building 105 Old Dry Cleaning Facility, NSGL, Installation Restoration Program, Great Lakes, Illinois. March 2008
- Record of Decision for Site 22 – Former Building 105 Old Dry Cleaning Facility, NSGL, Great Lakes, Illinois. TtNUS, May 2008
- Illinois EPA Approval of Record of Decision for Site 22, Former Building 105 Old Dry Cleaning Facility, NSGL, Illinois. September 5, 2008

- Remedial Design for Land Use Controls (LUCRD), NSGL, Site 22 – Former Building 105 – Old Dry Cleaning Facility. TtNUS, July 2009.

## **2.4.2 Monitoring Data Review**

There is no long-term monitoring associated with Site 22, other than annual LUC site inspections of the engineered barrier.

## **2.4.3 Site Visit and Inspection and Interview**

Site 22 Former Building 105 was inspected on September 20, 2012, by Mr. Benjamin Simes from NAVFAC Midwest, Mr. Brian Conrath of Illinois EPA, and Mr. Matt Mesarch and Mr. Ken Brown of Resolution Consultants. There was no fence in place at Site 22 or required by the LUCs; however, base-wide access is restricted. Monitoring wells were still in place on the site. If the wells are no longer needed, they should be abandoned to reduce the potential for tampering. According to Mr. Simes, there is a liner under the pavement. There were cracks and surface bulging noted in the asphalt around former ERH probe locations, but these do not affect the protectiveness of the engineered cover. Comments and issues were recorded on the site inspection checklist included in Appendix C. Photographs of the site are presented in Appendix D.

Site 22 was also inspected on August 15, 2013, by Mr. Howard Hickey, and no property use changes to the site were noted. No evidence of breaches to the LUCs was noted, although general wear was noted on the pavement which may require maintenance. A copy of the site inspection form is included in Appendix C.

Annual inspections of Site 22 have been conducted by the Illinois EPA and Navy since 2010. According to inspection documents from 2010 to 2014, no issues were identified at Site 22 during this five year review period.

An interview was conducted with Mr. Benjamin Simes during the site inspection walkthrough conducted in September 2012. Mr. Simes provided a history of the site and responded to questions regarding the response actions taken at the property. Mr. Simes and other NAVFAC and contract Five-Year Review team members worked collaboratively to compile information, review site data, review the condition of the site, and assess the protectiveness of the remedy. Team members were determined to be the most knowledgeable personnel about remedy implementation, site closures, and long-term maintenance and monitoring requirements.

## **2.5 Technical Assessment**

The objective of the five-year review is to evaluate whether the RA implemented at a site will be protective of human health and the environment. The effectiveness of RAs is evaluated through comparison to the RAOs for each site. To provide a framework for organizing and evaluating data and information, and to ensure that all relevant issues are considered when evaluating the protectiveness of the remedy, the USEPA guidance lists three questions to consider:

### **2.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Document?**

The remedy was implemented to protect human health by addressing COCs and preventing exposure. The remedy included the installation of an engineered barrier (asphalt pavement over

HDPE liner) and LUCs. Asphalt pavement in the area of the former Building 105 and an HDPE liner just below the ground surface covers residual contaminated soil to prevent exposure. The asphalt pavement is maintained by the NAVFAC Public Works Department.

LUCs for soil and groundwater have been established and are recorded with the Navy's LUC Tracker system. The use restriction agreed upon by the Navy and the State include:

- Property Use Restriction – Site 22 does not pose a risk to human health and environment under an industrial/commercial land use scenario. It is restricted from residential use.
- Groundwater Use Restriction – Installation of groundwater wells (other than environmental evaluation of monitoring wells) in this area, as well as all of NSGL, is prohibited to prevent consumption of groundwater.
- Maintenance of Engineered Cover – Engineered cover must be inspected on an annual basis and maintained.

Current conditions indicate that the remedy, including the engineered cover and LUCs, is functioning as intended. The property is not being used in a manner inconsistent with the use restriction, groundwater is not being used for any purpose, and the engineered cover is being maintained.

The remedy is functioning as intended by the decision document.

#### **2.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives Used at the Time of the Remedy Selection Still Valid?**

There have been no changes at the site (e.g., new contaminant sources, new ecological risks, or receptors) which would impact this remedy's protectiveness. The exposure assumptions, cleanup levels, and RAOs for this site have not changed and are still valid. ARARs were reviewed and it was determined that no changes have occurred that would impact protectiveness.

#### **2.5.3 Question C: Has any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?**

No additional information has been obtained that would call into question the protectiveness of the remedy. The existing land use restrictions are effective in protecting human health and the environment while concentrations of the COC exceed the cleanup criteria.

## **2.6 Issues**

The issues identified at Site 22 during the Five-Year Review process are summarized in the following table.

Issue	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
	Current	Future
<b>Site 22 – Former Building 105 Old Dry Cleaning Facility</b>		
Monitoring wells from the investigation and ERH Treatability Study are still in place. These monitoring wells remain for possible use in the investigation at Site 8, Building 144/145 Exchange Service Station.	N	N

## 2.7 Recommendations

The recommendations and follow-up actions identified in the Five-Year Review process for Site 22 are summarized in the table below.

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Site 22, Former Building 105						
Monitoring wells from the investigation and ERH Treatability Study are still in place	Properly abandon all wells on the site	Navy	Illinois EPA	30 Dec 2014	N	N

## 2.8 Protectiveness Statements

The remedy at Site 22 is protective of human health and the environment.

No unacceptable risks exist at the site from impacted soil, groundwater, or vapor, as applicable exposure pathways are being controlled by the remedy. The ERH Treatability Study reduced the mass of contaminants at the site, brought potential current and future carcinogenic risks into the USEPA risk range, and reduced potential current and future non-carcinogenic risks to acceptable levels. To address any residual contamination that could be present above Illinois EPA TACO criteria, LUCs serve as the remedy by restricting property and groundwater use, maintaining engineered barriers, and requiring annual inspections to ensure the continuation and enforcement of the LUCs. The implemented remedial action continues to meet RAOs.

Specifically there are no buildings at Site 22. The engineered barrier prevents direct contact between humans or animals and any residual contamination. In addition, NSGL lies within an area comprised of relatively impermeable till material, with relatively low hydraulic conductivities, and groundwater as a drinking water source is prohibited by Navy directive.

### 3.0 Site 3 – Supplyside Landfill

No ROD was prepared for this site but the landfill was closed using Illinois EPA regulations as guidance and with Illinois EPA oversight. This five-year review of Site 3 is required by statute because hazardous substances, pollutants, or contaminants remain on site that do not allow for UU/UE. The location of Site 3 is shown on Figure 1-2 and the layout of Site 3 is shown on Figure 3-1. The remedy for the Supplyside Landfill site is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. A clay cap over the waste on top of the landfill prevents direct contact between humans or animals and the waste. The landfill cap was reconstructed in 2004 to address inadequacies and to maintain the remedy's control of potential exposure pathways. A perimeter fence around the landfill limits access to the site. The remedy in place continues to be protective of human health and the environment.

### 3.1 Site Chronology – Table 3

The following table presents the chronology for the key events at Site 3.

Event	Date
Landfill Operation	1969 - 1983
Closure Plan Development	1983
Soil Cover Placement	1985
Certification of Closure from Illinois EPA	1988
Existing Conditions Investigation and Proposed Modifications Report	2001 - 2003
Quarterly Operation and Maintenance Sampling Report	2003 - 2007
Environmental Engineering/Cost Analysis Report with Streamlined Risk Assessment	2004
Non-Time Critical Remedial Action Remedial Design/Cap Work Plan	May 2004
Construction Start Date	July 2004
Construction Completion Date	October 2004
Relocation of Asbestos Soil and Cover Completion	October 2005
Monitoring Well Installation and Development Closure Report	January 2007
Groundwater Monitoring Events (Quarterly, Semiannual, and Annual)	2006 - present
Remedial Action Completion Report (RACR)	December 2009
State Approval of RACR	January 2010

### 3.2 Background

#### 3.2.1 Physical Setting

Site 3 is a former landfill, called the Supplyside Landfill, located on the western portion of the NSGL, south of the base supply warehouses. The site is bordered by Alabama Avenue and the sewage containment facility on the south, the Soo Lines (subsidiary of the Canadian Pacific Railway) railroad tracks to the west, Building 3503 to the north, and Building 1033 and a small creek (Skokie Ditch) and Forrestal Village Park to the east. Land use to the east of Site 3 is residential base housing; and is not considered to be an environmentally sensitive area. The site is illustrated in Figure 3-1.

Site 3 is located about 800 feet from residential areas to the east that are part of the Forrestal Village residential area. The park immediately to the east of the site was formerly residential homes that were removed to build the park.

Before its use as a landfill, the site was within the boundaries of the NSGL, and was mostly unused and undeveloped, except for a railroad spur that was used to service the supply buildings to the north of the site.

Site 3 is capped with clay with a well-maintained vegetative cover. The site surface is sloped, gently on the top and more severely on the sides, to prohibit water from infiltrating the waste trenches and leaching further contaminants to groundwater. Based on depth-to-groundwater measurements reported in the most recent Long-Term Groundwater Monitoring Report, the groundwater flow direction at the site is in the north direction. The neighboring facilities to the north include the supply warehouse (Building 3503), the Skokie Ditch, and the Forrestal Village Park. The nearest residential area is approximately 1,100 feet to the north and 500 feet to the east of the site. The Skokie Ditch is a small stream located adjacent to Site 3 to the east and runs south to the Skokie River, and eventually connects to Lake Michigan. Recent groundwater laboratory analytical reports are included in Appendix A.

### **3.2.2 Land and Resource Use**

The Supplside Landfill began operations in 1969 and was used until 1983. The landfill boundaries are roughly 450 feet wide by 1,400 feet long, covering about 14 acres. There are conflicting reports of the number of cubic yards of refuse that were disposed at the landfill, which was constructed of four parallel trenches. Historical documents indicate that wastes were not burned, and no hazardous wastes were disposed at the landfill. Disposal activities at the Supplside Landfill ceased in 1983.

Site 3 is currently covered by grass and other vegetation, and the site is fenced to limit access. The site is currently not in use. Activities at the property are limited to those actions, such as groundwater monitoring and the inspection of cover materials and methane gas vents that are necessary to ensure proper functioning of the remedy. The Navy does not currently have any plans for development of the site, and future plans are to maintain the landfill cover, gas vents, and fence and maintain the site undeveloped. LUC 12 restricts reuse to an industrial/commercial land use scenario, under which the site does not pose a threat to human health or the environment.

According to the 2012 Groundwater Monitoring Report (Tetra Tech, 2012), the groundwater beneath Site 3 flows towards the north. The installation of groundwater wells (other than environmental monitoring wells) in this area is prohibited to prevent the consumption of groundwater. LUCs are in place for the site to prohibit groundwater use, maintain the engineered landfill cover, and prohibit the disturbance of soil on the site.

Changes to the use of the surrounding properties are currently not being considered by the Navy.

### **3.2.3 History of Contamination**

Site 3 was used to dispose of wastes, primarily office and other solid wastes, in four parallel trenches. Reportedly, no liquids, metals, or sanitary wastes were disposed at the landfill. Wastes were not burned, according to previous documentation.

Investigations were conducted at Site 3 in 2001 to determine the presence and extent of methane and VOCs. Additional investigations were conducted in 2002 and 2003 to determine the thickness

and other properties of the existing clay cap and to collect groundwater samples from beneath the wastes.

A clay cap was placed on the landfill in 1985. The construction of the cover was completed by the Navy Construction Battalion 401, which was stationed at the NSGL at the time. Between 1999 and 2001, the Navy removed the railroad tracks, filled areas between the trenches, and placed additional clay on top of the landfill (Graef Anholt, Schlomer, and Associates, Inc. [GASA], 2004).

A new cover was constructed on the Suppyside Landfill in 2004. The landfill was re-graded to create a flat surface with a gradual slope across the top of the landfill. A three percent slope was created on the top surface for drainage and erosion control, and 3-to-1 slope was created around the perimeter of the landfill. The final cover construction included of 18 inches of low permeability clay with 6 inches of topsoil to support vegetative growth. A passive vent system was installed that consisted of shallow trenches excavated in the waste material, with horizontal collector pipes and vertical vent pipes. Geotextile fabric and additional clay were installed in 2005 over a 330-foot by 550-foot area at the north end of the landfill to cover about 12,000 cubic yards of soil with asbestos-containing material (non-friable transite) (ToITest, 2006).

Groundwater beneath the landfill is impacted by semi-volatile organic compounds (SVOCs), herbicides, and several metals and inorganics at concentrations exceeding regulatory criteria.

### **3.2.4 Initial Response**

Investigations of Site 3 were initiated in 2001 to determine the presence of methane and VOCs. In 2002 and 2003, investigations were conducted to determine the thickness and properties of the existing soil caps and to collect samples of leachate from the waste mass (ToITest, 2007). In 2006, six groundwater monitoring wells were installed around the perimeter of the landfill (SSL-01 through SSL-06).

### **3.2.5 Basis for Taking Action**

A meeting in 2003 between representatives of NAVFAC and the Illinois EPA discussed the regulatory status of Site 3 and assessed options for reducing the long-term environmental impact of the landfill. It was determined that additional remedial actions should be performed at Site 3 using the presumptive remedy of containment as listed in the U.S. EPA municipal landfill presumptive remedy guidance. Soil is likely contaminated beneath the waste trenches, but characterization of these soil has not been completed. Groundwater has been impacted by contaminant releases from the landfill, as evidenced by contaminant concentrations in groundwater samples collected from monitoring wells at the perimeter of the landfill. Contaminants associated with Site 3 are SVOCs, herbicides, metals, and other inorganics, and impact groundwater at concentrations exceeding regulatory criteria.

The clay cap was constructed to address the following RAOs (TtNUS, 2009):

- Reduce the risk of groundwater and surface water contamination through contact with the waste material, and reduce the risk of direct contact with the waste materials for humans and wildlife
- Improve the management of methane gas
- Comply with Applicable or Relevant and Appropriate Requirements

- Minimize initial construction and long-term operating costs
- Provide a finished surface that is suitable to serve the light recreational needs of the surrounding base community.

### **3.3 Remedial Actions**

#### **3.3.1 Remedy Selection**

An Engineering Evaluation/Cost Analysis (EE/CA) was completed in 2004 (TtNUS 2009), established RAOs, and recommended the construction of new protective cover on the landfill. It was determined that a new protective clay cap would address the following RAOs:

- Improve environmental integrity of cap by reducing infiltration and managing landfill gas safely to prevent migration and odor problems.
- Provide and document low-permeability clay cap that will improve surface drainage and provide additional barrier to potential contact with buried wastes.
- Provide regraded and contoured landfill final cover surface conducive to end use of light recreational activities serving need of surrounding base community.

#### **3.3.2 Remedy Implementation**

In May 2004, a work plan was prepared detailing the RAs required to implement and construct the Supplside Landfill cover (Toltest, 2004). Seven key elements of the RA identified in the work plan included the following:

- Permitting
- Installation of erosion control measures and site fencing
- Installation of passive landfill gas collection system
- Placing/compacting clay cap material
- Placing of topsoil and seeding
- Long-term maintenance
- Implementation of LUC that allow for future use of open land on landfill surface while preventing potentially adverse/damaging activities and allowing unrestricted use of adjacent areas.

Designs and specifications for the RA were provided in the work plan, along with O&M and construction quality assurance and quality control (QA/QC) requirements, and an Erosion Control and Vegetation Plan.

In July through October 2004, construction of the new landfill cover was completed then surveyed by Graef, Anhalt, Shloemer and Associates in 2008. The survey determined that the cover (clay and topsoil) is thicker than the specified 24 inches over most of the landfill. The cover was

designed to be a minimum of 18 inches of compacted clay and the topsoil layer was designed to be a minimum of 6 inches thick. The cover was vegetated by spreading grass seed. A gas collection system was installed during construction of the new clay cap by trenching and installation of piping and headers to collect any potential landfill gases that would then be vented directly to the atmosphere.

A Remedial Action Completion Report (RACR) was submitted to Illinois EPA in 2009. The objective of the RACR was to document construction of the cover on the landfill. The RACR for the Supplyside Landfill was approved by Illinois EPA in January 2010. Groundwater monitoring has been conducted at the Supplyside Landfill since 2003, and was initiated on a quarterly frequency and has decreased to annual monitoring. The RACR also explained that the northern portion of the landfill has a cover thickness in excess of 4 feet. Several weeks after the new cap was installed, suspect asbestos containing material was observed in the topsoil in the northern portion of the landfill. The Navy identified the material as transite asbestos, and obtained approval from the State in April 2005 to place additional transite-impacted soil on the landfill, followed by the installation of a geotextile fabric and an additional 6 inches of clean topsoil.

In 2009, Tetra Tech evaluated the cover thickness through the collection of data from 25 hand auger borings. The data indicated that the cap contained the required thicknesses of clay and topsoil, and that work plan requirements have been met and no problem with the soil cover with the remedy implementation exists. One sampling point was determined to have less than 6 inches of topsoil, however the surrounding points contained 6 inches or more of topsoil, and that a subsurface anomaly in the underlying clay layer surface could have caused a thinner layer of topsoil at that point.

Groundwater monitoring is being conducted at the Supplyside Landfill to comply with Federal and Illinois requirements for landfill closure since 2006. A groundwater monitoring program was part of the planned RA and sampling has been conducted at 6 monitoring wells installed as outlined in the May 2004 work plan. Wells were installed outside the limits of waste and were initially sampled on a quarterly basis. The Illinois EPA has since approved an annual sampling frequency. Institutional controls in the form of LUCs have been implemented through a LUC Memorandum of Agreement (LUCMOA) via a LUC Implementation Plan to restrict groundwater use and soil disturbance. The cover was vegetated with grass, and an annual inspection is required by the LUC Implementation Plan.

### **3.3.3 System Operations/O&M**

In accordance with the institutional control and monitoring components of the remedy, the following ongoing activities are performed to show that the site is complying with LUC requirements:

- Annual inspection of site, including fencing and signs, cap conditions, storm water control features, and monitoring wells.
- Enforcement of LUCs per LUC Implementation Plan that will be part of LUCMOA
- Maintenance of cover and monitoring wells, as needed, based on LUC inspection results
- Annual groundwater monitoring and reporting.

## **3.4 Five-Year Review Process**

### **3.4.1 Document Review**

The following documents were reviewed for Site 3 (Supplieside Landfill):

- Site 3 LUC Implementation Plan, TtNUS, 2009
- Remedial Action Completion Report, Site 3 Supplieside Landfill, TtNUS, December 2009
- Correspondence dated 19 Jan 2010 from Illinois EPA to Bill Busko, NAVFAC Midwest approving the Remedial Action Completion Report
- Delivery Order Completion Report, Supplieside Landfill O&M, Toltest, July 1999
- Long-Term Groundwater Monitoring Report Round 14 (May 2011) for Site 2 – Forrestal Landfill and Site 3 – Supplieside Landfill, Tetra Tech, January 2012

### **3.4.2 Monitoring Data Review**

The Navy has conducted groundwater monitoring at Site 3 since August 2006 to comply with federal and Illinois requirements for closure of landfills under RCRA. Groundwater monitoring is currently being conducted annually, but had previously been conducted quarterly and semi-annually. As part of the evaluation of the groundwater data that is performed for the Long-Term Groundwater Monitoring Reports, groundwater data is compared to State of Illinois Tiered Approach to Corrective Action Objectives (TACO) criteria or, in the absence of a TACO criterion, to the USEPA primary or secondary Maximum Contaminant Level (MCL).<sup>1</sup> Evaluation also includes comparison to previous rounds of groundwater monitoring and a trend analysis of the data. Round 16 of groundwater monitoring was completed in 2013 and reported in the Long-Term Groundwater Monitoring Report dated December 2013. Six wells at Site 3 were sampled and samples were submitted to a laboratory for analysis of VOCs, SVOCs, herbicides, metals, chlorides, ammonia, sulfates, nitrates, nitrites, and total dissolved solids (TDS). The following contaminants exhibited concentrations exceeding criteria:

- One VOC (tetrahydrofuran) was detected in one sample and no SVOCs were detected in samples during the latest round of groundwater monitoring at concentrations exceeding TACO criteria.
- Iron, manganese, aluminum, and arsenic were detected in unfiltered samples at concentrations exceeding TACO and non-TACO criteria in at least one sample.
- Chloride was detected in one sample at a concentration greater than TACO criterion.
- TDS concentrations detected in 5 of 6 samples exceeded USEPA secondary MCL.

Contaminant concentrations as compared to previous sampling results are mixed with some wells exhibiting increasing trends and other exhibiting decreasing contaminant trends. For more information, please see the Long-Term Groundwater Monitoring Report Round 16 (Resolution

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<sup>1</sup> TACO Tier 1 criteria are considered "To Be Considered" standards. Secondary MCLs are unenforceable goals related to water taste, odor, and color and are not ARARs unless promulgated by states.

Consultants 2014). A summary of the most recent groundwater sampling data is provided in Appendix A.

As part of its review of the Round 16 Report, the Illinois EPA noted that the approved Sampling and Analysis Plan (SAP) defines the Project Action Limits (PALs) as being the lowest of the listed screening values, which also includes non-TACO Groundwater Remediation Objectives and Illinois EPA's Groundwater Quality Standards (35 Illinois Administrative Code [IAC] 620.410) for Class I Groundwater. This correction will be made for future Long-Term Groundwater Monitoring Reports.

### **3.4.3 Site Visit and Inspection and Interview**

Site 3 (Supplieside Landfill) was inspected on September 20, 2012, by Mr. Benjamin Simes from NAVFAC Midwest, Mr. Brian Conrath of the Illinois EPA, and Mr. Matt Mesarch and Mr. Ken Brown of Resolution Consultants. The site fence, cover, and vegetation were in overall good condition. Minor issues noted included an area of suspected subsidence and a small area of bare soil or sparse vegetation. The bare area should be repaired by seeding and mulching; and the subsidence area should be watched for continued sinking. Also, two of the passive vents were not turning and appeared to be in need of repair. They can be repaired by replacement or repair of the turning vents. Comments and issues were recorded on the site inspection checklist included in Appendix C.

Site 3 was inspected on August 15, 2013, by Mr. Howard Hickey, during which no discrepancies or LUC breaches were noted. The site's use complies with the applicable LUCs. A copy of the 2013 inspection form is provided in Appendix C.

Site 3 annual inspections have been conducted by the State and Navy since 2009. According to inspection documents, in 2010 the State noted that there was material dumped including dried out sod, bricks, broken concrete, some with metal protruding, and assorted landscape-type waste along the middle of the cap running approximately east-west. The material appeared to be in an area that may have had some erosional issues or at least did not drain properly. The Navy addressed this issue by identifying the company dumping the material, obtaining the padlock key they were using to get onto the site, changing the lock to the site, and initiating a procedure that companies requiring site access be accompanied by Naval Station Great Lakes personnel according to the Environmental Director. No waste was observed during the 2012 or 2013 inspections.

An interview was conducted with Mr. Benjamin Simes during the site inspection walkthrough conducted in September 2012. Mr. Simes provided a history of the site and responded to questions regarding the response actions taken at the property. Mr. Simes and other NAVFAC and contract Five-Year Review team members worked collaboratively to compile information, review site data, review the condition of the site, and assess the protectiveness of the remedy.

## **3.5 Technical Assessment**

The objective of the five-year review is to evaluate whether the RA implemented at a site protects human health and the environment. The effectiveness of RAs is evaluated through comparison to the RAOs for each site. To provide a framework for organizing and evaluating data and information, and to ensure that all relevant issues are considered when evaluating the protectiveness of the remedy, the USEPA guidance lists three questions to consider:

### **3.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Document?**

The remedy was implemented at Site 3 to address an inadequate clay cap originally installed in 1985 and meet the Illinois EPA requirements for closure of landfills. The selected remedy included cover repair, groundwater monitoring, and use of institutional controls. The RACR describes a meeting in 2003 between representatives of NAVFAC Midwest and Illinois EPA, where additional RAs were deemed necessary for reducing the long-term environmental impact of the landfill.

In 2004, a work plan was developed to identify necessary improvements to the Suppyside landfill cover that included construction drawings, a project schedule, Health and Safety Plan, and a Stormwater Pollution Prevention Plan. The project was initiated to address inadequacies in the clay cap originally installed that could potentially cause a direct contact exposure pathway by humans with waste in the landfill. The landfill clay cap was re-graded, re-contoured, and reseeded. A new venting system was installed and consisted of shallow trenches excavated in the waste material, with horizontal collector pipes in granular bedding. The trenches and collector pipes allow gases generated during the decomposition of wastes to escape and not become trapped beneath the cover.

Land use restrictions for soil and groundwater have been established and are recorded with the Navy's LUC Tracker system. The use restrictions agreed upon by the Navy and Illinois EPA include:

- Property Use Restriction – Site does not pose a risk to human health and environment under light recreational use. Any residential use is prohibited.
- Groundwater Use Restriction – Installation of groundwater wells (other than environmental or monitoring wells) is prohibited to prevent exposure to contaminated groundwater. Sampling of groundwater from site's monitoring well network is currently conducted annually.
- Soil Disturbance Restriction – Excavation and uncontrolled removal of soil from Suppyside Landfill without prior approval of Navy and Illinois EPA are prohibited.
- Maintenance of Landfill Clay Cap – Landfill clay cap is required to be inspected on semi-annual basis and maintained.

The site is completely fenced with no trespassing signs placed on the perimeter fence. The perimeter fence is in good condition and denotes site and land use restriction boundaries.

Current conditions indicate that the remedy, including the landfill cover and land use controls, is functioning as intended. The property is not being used in a manner inconsistent with the use restriction, groundwater is not being used for any purpose other than annual environmental monitoring, and soil is not being disturbed, and the engineered cover is being maintained. However, a couple of issues related to maintenance of the engineered cover are listed below.

### **3.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives Used at the Time of the Remedy Selection Still Valid?**

There have been no changes at the site (e.g., new contaminant sources, new ecological risks, or receptors) which would inhibit this remedy's protectiveness. The exposure assumptions, cleanup

levels, and RAOs for this site have not changed and are still valid. ARARs were reviewed and it was determined that no changes have occurred that would impact protectiveness.

### 3.5.3 Question C: Has any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?

No additional information has been obtained that would call into question the protectiveness of the remedy. Repair of the landfill cover in 2004 was effective in restoring the protectiveness of the remedy and preventing direct contact of waste in the landfill by humans. The existing land use restrictions are effective in protecting human health and the environment while concentrations of the COC exceed the cleanup criteria.

## 3.6 Issues

The issues identified at Site 3 during the Five-Year Review process are summarized in the following table.

Issue	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
	Current	Future
<b>Site 3, Supplyside Landfill</b>		
Observed bare area on landfill cover	N	N
Two gas vents not spinning	N	N
30 ft by 20 ft subsidence area observed	N	N

## 3.7 Recommendations

The recommendations and follow-up actions identified in the Five-Year Review process for Site 3 are summarized in the table below.

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Site 3, Supplyside Landfill						
Bare area on landfill cover	Seed and mulch the area to prevent topsoil erosion	Navy	Illinois EPA	30 Dec 2014	N	N
Two gas vents not spinning	Check and ensure gas vents are functioning properly	Navy	Illinois EPA	30 Dec 2014	N	N
30 ft by 20 ft subsidence area observed	Investigate and repair subsidence area, if necessary	Navy	Illinois EPA	30 Dec 2014	N	N

### **3.8 Protectiveness Statements**

The remedy at Site 3 is protective of human health and the environment.

No unacceptable risks exist at the site from impacted soil, groundwater, or vapor, as applicable exposure pathways are being controlled by the remedy. LUCs are included in the remedy to restrict property and groundwater use. The landfill cover is maintained. Annual inspections are performed to verify the condition of the landfill cover and to ensure the continuation and enforcement of the LUCs. Annual groundwater monitoring is being conducted in accordance with Illinois EPA landfill closure requirements.

There are no buildings present at Site 3. A clay cap and vegetative cover prevent direct contact between humans or animals and any subsurface contamination. In addition, NSGL lies within an area comprised of relatively impermeable till material, with relatively low hydraulic conductivities, and groundwater as a drinking water source is prohibited by Navy directive.

## 4.0 Site 2 Forrestal Landfill

No ROD was prepared for this site but the landfill was closed using Illinois EPA regulations as guidance and with Illinois EPA oversight. This five-year review of Site 2 is required by statute because hazardous substances, pollutants, or contaminants remain on site that do not allow for UU/UE. The location of Site 2 is shown on Figure 1-2 and the layout of Site 2 is shown on Figure 4-1. The remedy for the Forrestal Landfill site is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. A clay cap over the waste on top of the landfill prevents direct contact between humans or animals and the waste. The landfill cap was reconstructed in 2004 to address settlement issues and to maintain the remedy's control of potential exposure pathways. A perimeter fence surrounds the landfill on three sides but does not limit access to the site. The remedy in place continues to be protective of human health and the environment.

### 4.1 Site Chronology – Table 4

The following table presents the chronology for the key events at Site 2.

Event	Date
Landfill Operation	1967 - 1969
Site Investigations	2000 - 2003
Final Cover Study	May 2004
Engineering Evaluation/Cost Analysis (EE/CA)	2004
Non-Time Critical Remedial Action Remedial Design Work Plan	2004
Construction Start Date	May 2004
Construction Completion Date	October 2004
Monitoring Well Installation and Development Closure Report	January 2007
Groundwater Monitoring Events (Quarterly, Semiannual, and Annual)	2006 - present
Remedial Action Completion Report	October 2009
Illinois EPA Approval of RACR	November 2009

Note: An Engineering Evaluation/Cost Analysis report was completed in 2004 by Graef, Anhalt, Schloemer & Associates in 2004, and is referenced extensively in the 2009 Remedial Action Completion Report. Many of those references are used in this report.

## 4.2 Background

### 4.2.1 Physical Setting

Site 2 is a former landfill, called the Forrestal Landfill, located on the western portion of NSGL, east of the base supply warehouses. The site is bordered by Superior Street and a supply building (Building 3502) on the west, a portion of the Forrestal Village Park and Skokie Ditch to the north, Skokie Ditch and residences (base housing) to the east, and an undeveloped parcel called the Panhandle Area to the south. Site 2 is not located in an environmentally sensitive area. The site is illustrated in Figure 4-1.

Site 2 is located about 250 feet from residential areas to the east that are part of the Forrestal Village residential area. The park immediately to the east of the site was formerly single-family residences that were removed to build the park.

Before its use as a landfill, the site was within the boundaries of the NSGL, and was mostly unused and undeveloped.

#### **4.2.2 Land and Resource Use**

The Forrestal Landfill began operations in 1967 and operated for only a short period until it was closed in 1969. The landfill was the first controlled disposal site used by the NSGL. The landfill boundaries are roughly 400 feet by 500 feet, covering about 4.5 acres. Historical documents indicate that wastes were not burned, and wastes disposed at the Forrestal landfill consisted of mixed office waste and shop waste.

Site 2 is currently covered by grass and other vegetation, and the site is fenced on three sides, but access is open on the landfill's north side. The site is not used for anything but groundwater monitoring. The Navy does not currently have any plans for development of the site, and future plans are to maintain the engineered landfill cover, gas vents, and fence, and maintain the site undeveloped. The LUC restricts reuse to an industrial/commercial land use scenario, under which the Site does not pose a threat to human health or the environment.

According to the 2012 Groundwater Monitoring Report (Tetra Tech, 2012), the groundwater beneath Site 2 appears to mound and flows towards mainly to the north, but also to the south. The installation of groundwater wells (other than environmental monitoring wells) in this area is prohibited. LUC are currently in place for the site to prohibit groundwater use, maintain the landfill cover, and prohibit the disturbance of soil on the site.

Changes to the use of the surrounding properties are currently not being considered by the Navy.

#### **4.2.3 History of Contamination**

Site 2 was reportedly used to dispose of wastes, primarily office and other solid wastes. According to previous documentation, no liquids, metals, or sanitary wastes were disposed at the landfill, and wastes were not burned.

Investigations were conducted at the landfill in 2001 to determine the presence and extent of methane and VOCs. Additional investigations were conducted in 2002 and 2003 to determine the thickness and other properties of the existing clay cover and to collect groundwater samples from beneath the wastes.

A cover evaluation and project plan were prepared for Site 2 in 2002, which was conducted to determine the thickness and properties of the existing clay cover and collect samples of water from the waste mass.

In 2006, six groundwater monitoring wells were installed in their current configuration around the perimeter of the landfill. Groundwater beneath the landfill is impacted by VOCs (below regulatory criteria), and several metals and inorganics at concentrations exceeding regulatory criteria.

#### **4.2.4 Initial Response**

Investigations of Site 2 were initiated in 2000 to determine the presence of methane and VOCs. In 2002, an investigation was conducted to determine the thickness and properties of the existing soil cap and to collect samples of water from the waste mass (TolTest, 2007). In 2006, six groundwater monitoring wells were installed around the perimeter of the landfill (FL-01 through FL-06).

A new, improved clay cap was constructed on the Forrestal Landfill in 2004. The landfill was re-graded to create a gradual slope across the top of the landfill. The final clay cap construction included 18 inches of low permeability clay with 6 inches of topsoil to support vegetative growth. A passive vent system was installed that consisted of shallow trenches excavated in the waste material, with horizontal collector pipes and vertical vent pipes.

A RACR was submitted to Illinois EPA in 2009. The objective of the RACR was to document construction of the clay cap on the landfill. The RACR for the Forrestal Landfill was approved by Illinois EPA in November 2009. Groundwater monitoring has been conducted at the Forrestal Landfill since 2006, which was initiated on a quarterly frequency and has decreased to annual monitoring.

#### **4.2.5 Basis for Taking Action**

A meeting in 2003 between representatives of NAVFAC and the Illinois EPA included discussion of the regulatory status of Site 2 and assessed options for reducing the long-term environmental impact of the landfill. It was determined that additional remedial actions should be performed at Site 2 using the presumptive remedy of containment as listed in the U.S. EPA municipal landfill presumptive remedy guidance. Soil is likely contaminated beneath the wastes, but characterization of this soil has not been completed. Groundwater has been impacted by contaminant releases from the landfill, as evidenced by contaminant concentrations in groundwater samples collected from monitoring wells at the perimeter of the landfill. Contaminants associated with Site 2 are VOCs, metals, and other inorganics, some of which impact groundwater at concentrations exceeding regulatory criteria.

The clay cap was constructed to address the following RAOs, which were provided in the 2004 EE/CA and referenced in the 2009 RACR (Tetra Tech 2009):

- Improve the environmental integrity of the cap by reduction infiltration and managing landfill gas safely to prevent migration and odor problems
- Provide a low-permeability clay cap that will improve surface drainage and provide an additional barrier to potential contact with buried wastes
- Provide a re-graded and contoured landfill final cover surface conducive to an end use of light recreational activities serving the needs of the surrounding base community.

### **4.3 Remedial Actions**

#### **4.3.1 Remedy Selection**

An EE/CA was completed in 2004 (TtNUS 2009) and established RAOs and recommended the construction of new protective clay cap on the landfill. It was determined that a new protective clay cap would address the following RAOs:

- Improve environmental integrity of cap by reducing infiltration and managing landfill gas safely to prevent migration and odor problems.
- Provide and document low-permeability clay cap that will improve surface drainage and provide additional barrier to potential contact with buried wastes.
- Provide regarded and contoured landfill final cover surface conducive to end use of light recreational activities serving need of surrounding base community.

#### **4.3.2 Remedy Implementation**

In May 2004, a work plan was prepared detailing the RAs required to implement and construct the Forrestal Landfill clay cap (Toltest, 2004). Seven key elements of the RA identified in the work plan included the following:

- Permitting
- Installation of erosion control measures and site fencing
- Installation of passive landfill gas collection system
- Placing/compacting clay cap material
- Placing of topsoil and seeding
- Long-term maintenance
- Implementation of LUC that allow for future use of open land on landfill surface while preventing potentially adverse/damaging activities and allowing unrestricted use of adjacent areas.

Designs and specifications for the RA were provided in the work plan, along with O&M and construction QA/QC requirements, and an Erosion Control and Vegetation Plan.

During the period May through October 2004, construction of the new landfill cover was constructed. The cover was completed as designed, with a minimum 18 inches of compacted clay, followed by a minimum of 6 inches of topsoil. The cover was vegetated by spreading of grass seed. A gas collection system was installed during construction of the new clay cap by trenching and installation of piping and headers to collect any potential landfill gases and vent them efficiently to the atmosphere.

A groundwater monitoring program was part of the planned RA and sampling has been conducted at six monitoring wells installed as outlined in the work plan. Wells were installed outside the limits of waste and were initially sampled on a quarterly basis. The Illinois EPA has since approved an annual sampling frequency. Institutional controls in the form of LUCs have been implemented through a LUCMOA via a LUC Implementation Plan to restrict groundwater use and soil disturbance.

The cover was vegetated with grass and an annual inspection is required by the LUC Implementation Plan.

Following the construction of the new clay cap, the Navy discovered that the topsoil used contained transite asbestos material. The Navy informed the Illinois EPA that the material was present and developed a plan to address the condition. The Navy installed a non-woven geotextile fabric over the transite-containing material followed by an additional 6 inches of clean topsoil placed on the fabric. The new topsoil was then seeded to establish vegetative growth.

#### **4.3.3 System Operations/O&M**

In accordance with the institutional control and monitoring components of the remedy, the following ongoing activities are performed:

- Annual inspection of site, including fencing and signs, cap conditions, storm water control features, and monitoring wells.
- Enforcement of LUCs per LUC Implementation Plan that is part of LUCMOA.
- Maintenance of cover and monitoring wells, as needed, based on LUC inspection results
- Annual groundwater monitoring and reporting.

### **4.4 Five-Year Review Process**

#### **4.4.1 Document Review**

The following documents were reviewed for Site 2 (Forrestal Landfill):

- Site 2 LUC Implementation Plan, TtNUS, 2009
- Remedial Action Completion Report, Site 2 Forrestal Landfill, TtNUS, October 2009
- Long-Term Groundwater Monitoring Report Round 14 (May 2011) for Site 2 – Forrestal Landfill and Site 3 – Supplyside Landfill, Tetra Tech, January 2012

#### **4.4.2 Monitoring Data Review**

The Navy has conducted groundwater monitoring at Site 2 since August 2006 to comply with federal and Illinois requirements for closure of the landfills under RCRA. Groundwater monitoring is currently being conducted annually, but had previously been conducted quarterly and semi-annually. Evaluation of data generated from groundwater sampling is evaluated by comparison of results to the State of Illinois TACO criteria or, in the absence of a TACO criterion, to the USEPA primary or secondary MCL.<sup>2</sup> Evaluation also includes comparison to previous rounds of groundwater monitoring and a trend analysis of the data.

Round 16 of groundwater monitoring was completed in 2013 and reported in the Long-Term Groundwater Monitoring Report dated December 2013. Six wells at Site 2 were sampled and samples were submitted to a laboratory for analysis of VOC, SVOC, herbicides, metals, chlorides, ammonia, sulfates, nitrates, nitrites, and TDS. The following contaminants exhibited concentrations exceeding criteria:

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<sup>2</sup> TACO Tier 1 criteria are considered "To Be Considered" standards. Secondary MCLs are unenforceable goals related to water taste, odor, and color and are not ARARs unless promulgated by states.

- Herbicide 2-methyl-4-chlorophenoxyacetic acid (MCPA) was detected in three samples and a duplicate sample at concentrations exceeding its non-TACO criterion.
- Aluminum, arsenic, iron, and manganese were detected in unfiltered samples at concentrations exceeding TACO and non-TACO criteria in at least one sample
- Chloride was detected in one sample at concentration greater than TACO criterion.
- Sulfate was detected in one sample at concentration greater than TACO criterion.
- TDS concentrations detected in all samples exceeded USEPA secondary MCL.

Contaminant concentrations as compared to previous sampling results are mixed with some wells exhibiting increasing trends and other exhibiting decreasing contaminant trends. The Long Term Groundwater Monitoring Report Round 16 (Resolution Consultants 2014) can be consulted for more information. A summary of the recent groundwater monitoring data is provided in Appendix A.

As part of its review of the Round 16 Report, the Illinois EPA noted that the approved Sampling and Analysis Plan (SAP) defines the Project Action Limits (PALs) as being the lowest of the listed screening values, which also includes non-TACO Groundwater Remediation Objectives and Illinois EPA's Groundwater Quality Standards (35 IAC 620.410) for Class I Groundwater. This correction will be made for future Long-Term Groundwater Monitoring Reports.

#### **4.4.3 Site Visit and Inspection and Interview**

Site 2 (Forrestal Landfill) was inspected on September 20, 2012, by Mr. Benjamin Simes from NAVFAC Midwest, Mr. Brian Conrath of the Illinois EPA, and Mr. Matt Mesarch and Mr. Ken Brown of Resolution Consultants. The site fence, cover, and vegetation were in overall good condition. Minor issues noted included an area of bare soil or sparse vegetation on the landfill's west side. The bare spot should be repaired by seeding and mulching. The one passive vent appeared to be not working. Comments and issues were recorded on the site inspection checklist included in Appendix C.

Site 2 was inspected on August 15, 2013, by Mr. Howard Hickey, and no breaches of LUC requirements were noted. Property use has not changed and no changes in ownership have occurred. A copy of the 2013 inspection form is provided in Appendix C.

Site 2 is capped with clay with a well-maintained vegetative cover. The site surface is sloped, gently on the top and more severely on the sides, to prohibit water from infiltrating the wastes and leaching further contaminants to groundwater. Based on depth-to-groundwater measurements reported in the most recent Long-Term Groundwater Monitoring Report, groundwater appears to mound under the landfill and the flow directions are to the north and south directions. The neighboring facilities to the north include the Forrestal Village Park and single-family residences. The nearest residential area is approximately 400 feet to the north and 400 feet to the east of the site. The Skokie Ditch is a small stream located immediately adjacent to Site 2 to the east and runs south to the Skokie River, and eventually connects to Lake Michigan.

Site 2 annual inspections were conducted by the Illinois EPA and Navy from 2009 through 2013. According to inspection documents, no issues were identified at Site 2 during that time period.

An interview was conducted with Mr. Benjamin Simes during the site inspection walkthrough conducted in September 2012. Mr. Simes provided a history of the site and responded to questions regarding the response actions taken at the property. Mr. Simes and other NAVFAC and contract Five-Year Review team members worked collaboratively to compile information, review site data, review the condition of the site, and assess the protectiveness of the remedy.

## **4.5 Technical Assessment**

The objective of the five-year review is to evaluate whether the RA implemented at a site protects human health and the environment. The effectiveness of RAs is evaluated through comparison to the RAOs for each site. To provide a framework for organizing and evaluating data and information, and to ensure that all relevant issues are considered when evaluating the protectiveness of the remedy, the USEPA guidance lists three questions to consider:

### **4.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Document?**

The landfill ceased operations in 1969, and no documentation of closure activities or cover construction was available. As part of decision in 2003 between representatives of NAVFAC Midwest and the Illinois EPA, additional RAs were deemed necessary for reducing the long-term environmental impact of the landfill. Because the existing cap had many surface irregularities and was placed without documentation of its quality and thickness, it was determined that the potential for exposure to waste and leachate generation from infiltration was unknown.

In 2004, a work plan was developed to propose modifications to the Forrestal Landfill cap that included construction drawings, a project schedule, Health and Safety Plan, and a Stormwater Pollution Prevention Plan. The landfill cover was regraded, recontoured, and reseeded. A new venting system was installed and consisted of shallow trenches excavated in the waste material, with horizontal collector pipes in granular bedding. The trenches and collector pipes allow gases generated during the decomposition of wastes to escape and not become trapped beneath the cover.

Land use restrictions for soil and groundwater have been established and are recorded with the Navy's LUC Tracker system. The use restrictions agreed upon by the Navy and Illinois EPA include:

- Property Use Restriction – Site does not pose risk to human health and environment under light recreational use. Any residential use is prohibited.
- Groundwater Use Restriction – Installation of groundwater wells (other than environmental or monitoring wells) is prohibited to prevent exposure to contaminated groundwater. Sampling of groundwater from site's monitoring well network is currently conducted annually.
- Soil Disturbance Restriction – Excavation and uncontrolled removal of soil from Forrestal Landfill without prior approval of Navy and Illinois EPA are prohibited.
- Maintenance of Landfill Clay Cap – Landfill clay cap is required to be inspected on annual basis and maintained.

The site is fenced on three sides, with no trespassing signs placed on the perimeter fence. The perimeter fence is in good condition and denotes site and land use restriction boundaries.

Current conditions indicate that the remedy, including the engineered cover and land use controls, is functioning as intended. The property is not being used in a manner inconsistent with the use restriction, groundwater is not being used for any purpose other than annual environmental monitoring, soil is not being disturbed, and the engineered cover is being maintained. However, a couple issues related to maintenance of the engineered cover are listed below.

#### **4.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives Used at the Time of the Remedy Selection Still Valid?**

There have been no changes at the site (e.g., new contaminant sources, new ecological risks, or receptors) which would inhibit this remedy's protectiveness. The exposure assumptions, cleanup levels, and RAOs for this site have not changed and are still valid. ARARs were reviewed and it was determined that no changes have occurred that would impact protectiveness.

#### **4.5.3 Question C: Has any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?**

No additional information has been obtained that would call into question the protectiveness of the remedy. In 2004 a landfill repair project was completed. Repair of the landfill cover was effective in restoring the protectiveness of the remedy and preventing direct contact exposure pathway by humans with waste in the landfill. The existing land use restrictions are effective in protecting human health and the environment while concentrations of the COC exceed the cleanup criteria.

### **4.6 Issues**

The issues identified at Site 2 during the Five-Year Review process are summarized in the following table.

Issue	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
	Current	Future
Site 2, Forrestal Landfill		
Observed bare area on landfill cover	N	N
Gas vent not spinning	N	N

### **4.7 Recommendations**

The recommendations and follow-up actions identified in the Five-Year Review process for Site 2 are summarized in the table below.

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Site 2, Forrestal Landfill						
Bare areas on landfill cover	Seed and mulch the area to prevent topsoil erosion	Navy	Illinois EPA	30 Sept 2014	N	N
Gas vent not spinning	Check and ensure gas vent is functioning properly	Navy	Illinois EPA	30 Sept 2014	N	N

## 4.8 Protectiveness Statements

The remedy at Site 2 is protective of human health and the environment.

No unacceptable risks exist at the site from impacted soil, groundwater or vapor, as applicable exposure pathways are being controlled by the remedy. LUCs are included in the remedy to restrict property and groundwater use. The landfill cover is maintained. Annual inspections are performed to verify the condition of the landfill cover and to ensure the continuation and enforcement of the LUCs. Annual groundwater monitoring is being conducted in accordance with Illinois EPA landfill closure requirements.

There are no buildings present at Site 2. A clay cap and vegetative cover prevents direct contact between humans or animals and any residual contamination. In addition, NSGL lies within an area comprised of relatively impermeable till material, with relatively low hydraulic conductivities, and groundwater as a drinking water source is prohibited by Navy directive.

## 5.0 Site 1 – Golf Course Landfill

The Site 1 and 4 ROD was signed in 2011. This five-year review of Site 1 is required by statute because hazardous substances, pollutants, or contaminants remain on site that do not allow for UU/UE. The location of Site 1 is shown on Figure 1-2 and the layout of Site 1 is shown on Figure 5-1. The remedy for the Golf Course Landfill site is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. A soil cover over the waste on top of the landfill prevents direct contact between humans or animals and the waste, and the plugging of former storm water conveyance pipes under the landfill prevent migration of residual contaminants. Access to the site is not limited by a perimeter fence around the site, however LUCs were implemented in 2011 to restrict future use of the site, prohibit installation of groundwater wells other than for environmental sampling, and require annual inspections of the site to ensure LUCs are continuing to be implemented. The remedy in place continues to be protective of human health and the environment.

### 5.1 Site Chronology – Table 5

The following table presents the chronology for the key events at Site 1.

Event	Date
Landfill Operation	1942 - 1967
Golf Course construction – Front Nine	1953 -1955
Landfill closure with layer of ash and soil	1967
Initial Assessment Study	1986
Golf Course construction – Back Nine	1968
Technical Memorandum on the Remedial Investigation Verification Step	1991
Golf Course reconstruction with placement of additional soil	2003
Sinkholes develop due to collapse of storm sewer pipe	2003
RI for Site 1	2008
FS for Sites 1 and 4	2009
ROD for Sites 1 and 4 completed	September 2010
ROD for Sites 1 and 4 Signature	January 2011
Remedial Design for Sites 1 and 4	November 2012
Groundwater Monitoring Events	June 2012 - present

## 5.2 Background

### 5.2.1 Physical Setting

Site 1 (Golf Course Landfill) is covered entirely by the approximately 125-acre golf course located in the northwest portion of the NSGL. The northwest side of NSGL is nonresidential and is not environmentally sensitive. It is bordered by commercial properties to the north, Highway 41 to the west, Buckley Road to the south, and base administrative facilities to the east. The golf course is contoured with mounds, tee boxes, bunkers, and greens with the general grade of the terrain moderately sloping towards the open channel portion of the Skokie Ditch channel on the southwest portion of the site. Three small, unlined, irrigation ponds which range in size from 0.4 to 1.4 acres in size are located in the northeastern corner of the golf course. Small, unlined ponds are also located in the southwestern and southeastern corner of the golf course. Other than the sand bunkers,

irrigation ponds, and Skokie Ditch area, the course surface is covered with grass that is frequently maintained (Tetra Tech 2011). The site is illustrated in Figure 5-1.

Regional aquitards formed by glacial till are present beneath Site 1. These aquitards are expected to limit downward migration of contaminants into deeper groundwater aquifers. Shallow groundwater, typically encountered at Site 1 between 1 and 17 feet bgs, is likely to be discontinuous across the site and is expected to have only limited lateral migration potential because of the geological profile across Site 1 (Tetra Tech 2011).

### **5.2.2 Land and Resource Use**

The western half of Site 1 was historically occupied by an approximately 49-acre landfill that operated between 1942 and 1967. Waste was contained in the landfill using burning in trenches and low-permeability soil cover. A dragline was used for excavation of the trenches which were 8 feet wide and extended to at least the top of the water table (approximately 6 to 8 feet deep). General refuse, trash, and free liquid oil were deposited directly into trenches which occasionally had several feet of standing water at their base. Skokie Ditch Open Channel and Skokie Ditch Pipe were located within the landfill footprint.

Between 1953 and 1955, the front 9-hole portion of the golf course was constructed west of the landfill. The clubhouse, Building 3312 and the parking lot were constructed in 1963. When the landfill was closed in 1967, a 0.5-foot layer of coal ash and a layer of soil with a minimum thickness of approximately 2 feet and an average thickness of approximately 6.5 feet were placed over the landfill. The back 9-hole portion of the golf course was constructed over the former landfill in 1968.

In 2003, sink holes occurred within the limits of Site 1. These sink holes were attributed to the collapse of the over 50-year old underground storm sewer pipe that conveyed the Skokie Ditch beneath Site 1. The clubhouse was demolished in 2007 and replaced in 2008 (Tetra Tech 2008).

Currently, Site 1 is located entirely within the limits of the 18-hole Willow Glen Golf Course. The golf course is owned and operated by the Navy and used by facility personnel and people from the surrounding area. Properties immediately adjacent to the site boundaries are generally commercial, industrial, or open space. Residential properties are located within a 1/8 of a mile to the north, east, south, and west of the site boundary. The future use of the surrounding land and of Site 1 as a golf course is not expected to change.

Several wells within a 3-mile radius of Site 1 were historically used as a drinking water supply and as agricultural wells. No water supply intakes from free-flowing or static water bodies are located within 3 miles of Site 1. Drinking water is supplied from Lake Michigan about 10 miles from the active Site 1 boundary (Doc: GL 000004, Site Inspection Form 3/16/1988).

### **5.2.3 History of Contamination**

The primary source of contamination of soil, sediment, groundwater and surface water at Site 1 is assumed to be the former landfill activities. The landfill received a total of approximately 1.5 million tons of waste while it was in operation as a trench/burn facility from 1942 to 1967. Due to the reduction of waste through burning, the remaining waste is estimated to be approximately 500,000 tons. Reportedly, the waste included mostly domestic refuse but also included sewage, sludge, petroleum, oil and lubricants, solvents, coal ash, and materials contaminated with polychlorinated biphenyls (PCBs).

#### **5.2.4 Initial Response**

The nature of contamination at Site 1 and the landfill limits were determined during several investigations from 1986 to 2009. During the 1986 Initial Assessment Study, Site 1 was identified as an area where further investigation was recommended to confirm or refute the presence of suspected contamination. In 1991, an investigation of surface water and groundwater was conducted. Sample analytical results had concentrations of inorganic compounds in groundwater that exceeded Illinois General Use Water Quality Standard Maximum Contaminant Levels, and results from the Skokie Ditch surface water (within Site 1) had concentrations of inorganic compounds, and oil and grease that exceeded Illinois EPA surface water quality criteria.

In 1998, sampling was conducted at Site 1 to be used to generate a contaminant hazard score and a resulting relative risk ranking. During the 1998 sampling, four shallow soil samples were collected from Site 1 and were analyzed for Target Analyte List metals, cyanide and Target Compound List (TCL) volatiles, semivolatiles, pesticides, and PCBs. Laboratory results indicated the presence of polyaromatic hydrocarbons (PAHs) and inorganics in soil samples at concentrations exceeding the Illinois EPA TACO residential and commercial remediation objectives and the exceedences of USEPA Region 9 PRGs.

An RI was conducted in 2008 at Site 1. During the 2008 RI, samples were collected from 16 of the 103 soil borings, 14 wells, five surface water locations, and seven sediment locations. The borings were used to visually delineate the extent of buried landfill material. Laboratory results indicated the presence of COPCs in subsurface soil, groundwater, surface water, and sediments at concentrations that exceeded the human health screening criteria. A risk assessment was performed using data from the RI at Sites 1 and 4 (TtNUS 2008). The risk assessment is further discussed in the Basis for Taking Action section below.

In 2009, a focused FS evaluated alternatives including the use of containment, monitoring and LUCs for Site 1 to eliminate unacceptable risks associated with leaving waste and contaminated media in place.

#### **5.2.5 Basis for Taking Action**

A HHRA was conducted for Site 1. It focused on VOCs, metals, chloride, and phosphorous as COPCs and evaluated construction workers, maintenance workers, adolescent trespassers, and hypothetical future occupational workers as well as civilian and military residents (adults and children) as potential receptors. Initially, COPCs were evaluated against conservative screening criteria, and exceedances caused COPCs to be considered for an HHRA.

The HHRA concluded that COPCs posed an elevated carcinogenic and/or noncarcinogenic risk to several receptors. Elevated carcinogenic and noncarcinogenic risks to maintenance workers were associated with dermal contact and ingestion of sediment and surface water. Dermal contact and ingestion originating from sediment and surface water posed an elevated risk to recreational users and trespassers. Inhalation of indoor air impacted with VOCs, inhalation of outdoor air affected by VOC migration, and ingestion of VOC-impacted soil posed elevated risk to future residents (Tetra Tech 2011).

Landfill wastes are to remain buried at Site 1. Without proper control, the landfill wastes have the potential to contaminate the following site media: subsurface soil, sediment, groundwater, and surface water.

The contaminants associated with these buried landfill wastes in each media include the following:

**Subsurface Soil**

- VOCs were detected in subsurface soil samples at concentrations less than applicable human health and ecologic screening criteria.
- PAHs and metals were detected in subsurface soil samples at concentrations that exceeded applicable human health and/or ecologic screening criteria. Metals that were detected include aluminum, antimony, arsenic, copper, chromium, iron, lead, silver, manganese, thallium, and vanadium.
- Pesticides and herbicides were detected in subsurface soil samples with concentrations in some soil samples exceeding applicable human health and ecologic screening criteria. Presence of low-level pesticides and herbicides in soil is likely result of routine historical use at golf course.
- Dioxin/furans were detected in subsurface soil samples with concentrations in some samples exceeding applicable human health risk-based criteria.
- Low-level PCBs were detected in subsurface soil samples at concentrations less than applicable human health and ecologic screening criteria in several soil samples.

**Sediment**

- PAHs and metals were detected in sediment samples at concentrations that exceeded applicable human health and/or ecologic screening criteria. Metals that were detected include aluminum, arsenic, barium, chromium, iron, lead, silver, manganese, thallium, and vanadium.
- Pesticides were detected in sediment samples with concentrations in some samples exceeding applicable human health and ecologic screening criteria. Presence of low-level pesticides is likely result of routine historical use at golf course.
- Dioxin/furans were detected in sediment samples with concentrations in some samples exceeding applicable ecologic screening criteria.
- Low-level PCBs were detected in one sediment sample at concentrations less than applicable human health and ecologic screening criteria.

**Groundwater**

- VOCs were detected in groundwater samples at concentrations less than applicable human health and ecologic screening criteria, with the exception of one groundwater sample that had a VOC concentration greater than a drinking water screening criterion. Benzene was detected on one well at 0.44J ug/L, which is above the USEPA Region 9 Tap Water Preliminary Remediation Goal of 0.35 ug/L.
- PAHs and metals were detected in groundwater samples at concentrations that exceeded applicable human health and/or ecologic screening criteria. Metals that were detected include aluminum, arsenic, barium, chromium, iron, lead, silver, manganese, thallium, and vanadium.

### **Surface Water**

- VOCs were detected in surface water samples at concentrations less than applicable human health and ecologic screening criteria, with the exception of two surface water samples that had vinyl chloride concentrations greater than a drinking water screening criterion. Vinyl Chloride was detected in two samples above the USEPA Region 9 Tap Water Preliminary Remediation Goal of 0.02 ug/L.
- PAHs and metals were detected in surface water samples at concentrations that exceeded applicable human health and/or ecologic screening criteria. Metals that were detected include aluminum, arsenic, barium, chromium, iron, lead, silver, manganese, thallium, and vanadium.

A HHRA and an ecological risk screening were conducted at Site 1 as part of the RI. Human risks identified under current and future land use scenarios were evaluated. The carcinogenic risks for exposure to subsurface soil, sediment, groundwater, and surface water under future and current use scenarios were elevated, but within the USEPA's target risk range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ . Carcinogenic risks exceeded the Illinois EPA's more stringent goal of  $1 \times 10^{-6}$  for most receptors contacting these media. The non-carcinogenic risks for exposure to groundwater exceeded a hazard index (HI) of 1 and are therefore considered unacceptable for future residential occupants. The Screening-Level Ecological Risk Assessment (SERA) determined that the overall risk to ecological receptors from Site 1 contaminants was negligible. The Navy and Illinois EPA determined that no further ecological evaluation was warranted.

## **5.3 Remedial Actions**

### **5.3.1 Remedy Selection**

The ROD for Site 1 and Site 4 was signed in January 2011 (Tetra Tech, 2011). The principal factors influencing selection of the remedy included:

- The remedy should be implemented in a short time frame, and be protective of human health and the environment, be cost-effective, and will result in a permanent solution to the maximum extent practicable.
- The remedy should be consistent with the current and reasonably anticipated future recreational use of the site.

The selected remedy included the use of LUCs to prevent access to remaining soil contamination and to maintain the existing engineered barrier. The following LUCs were implemented to achieve objectives:

- Property Use Restriction - Site 1 does not pose a threat to human health or the environment under an industrial/commercial land use scenario. Residential use of the property is prohibited.
- Groundwater Use Restriction - The installation of groundwater wells (other than environmental evaluation or monitoring wells) is prohibited to prevent exposure to contaminated groundwater. In addition, the installation of groundwater wells (other than environmental evaluation or monitoring wells) is prohibited in all geographic areas of Naval Station Great Lakes by Naval Station Great Lakes Instruction 11130.1 (Ground Water Use Restrictions).
- Soil Disturbance Restriction - The excavation and uncontrolled removal of soil from Site 1 without prior review of work plans by the Navy and the Illinois EPA is prohibited. These reviews

are necessary to ensure adequate worker health and safety precautions and to confirm proper management of contaminated materials.

- Maintenance of Soil Cover – A soil cover is present at the site to prevent exposure to contaminated soil. This cover will be inspected and maintained.

### **5.3.2 Remedy Implementation**

No source materials consisting of principle threat wastes (as defined in USEPA, 1991) are present at Site 1. Source materials present at Site 1 as buried landfill wastes have been covered and have remained relatively undisturbed and stable for several decades. The risk assessment determined that the source materials present at Site 1 do not present a significant risk to human health or the environment based on the current site use.

The ROD documents the following remedies selected as presumptive remedy for soil, groundwater, and sediment contamination in landfills:

- Placement of riprap layer of a limited area in the Skokie Ditch to address localized PAH contamination which was completed in 2011;
- Abandonment and replacement of damaged piping in Skokie Ditch and the relocation of a storm water sewer to the perimeter of the landfill which was completed in 2011;
- A cover over the landfill surface to prevent surface receptors from contact with contaminated soil and/or waste;
- Institutional controls to restrict use of land and groundwater;
- Groundwater monitoring to satisfy Illinois EPA landfill closure requirements; and
- Routine inspections and maintenance of the cover, sediment controls, and piping in the Skokie Ditch and institutional controls to ensure continued integrity.

### **5.3.3 System Operations/O&M**

In accordance with the LUC Implementation Plan that is part of the LUCMOA between Illinois EPA and Navy dated June 1, 2005, annual inspections of the Site 1 are required. As part of the Remedial Design, an O&M plan was prepared in November 2012 to guide post-closure inspection and maintenance of the site. The O&M at Site 1 includes the following:

- Post-closure care and reporting at Site 1 must be performed annually for 30 years in accordance with the IAC Title 35, Subtitle G, Chapter 1, Subchapter I, Parts 807-811.
- Groundwater sampling and analysis must be performed in accordance with the Sampling and Analysis Plan (Tetra Tech, 2012) and must meet the requirements of 35 IAC 620; and
- Annual inspection and maintenance of vegetative cover system, abandoned storm sewer system, and groundwater monitoring wells in accordance with the O&M plan (November 2012).

Groundwater monitoring has been conducted by sampling ten monitoring wells at Sites 1 and 4. Groundwater samples collected from the monitoring wells were submitted to a laboratory for

analysis of VOCs, pesticides, SVOCs, PCBs, dioxins and furans, metals, and other chemicals. Groundwater monitoring was completed in June, September, and December 2012; March, June, September/October, and December 2013; and March and June 2014.

## **5.4 Five-Year Review Process**

Site 1 is part of a comprehensive environmental investigation and cleanup program that has been performed at NSGL under CERCLA authority. The site is currently in the long-term monitoring phase of the CERCLA process.

### **5.4.1 Document Review**

The following documents were reviewed for Site 1 (Golf Course):

- Remedial Investigation and Risk Assessment Report, Site 1 – Golf Course Landfill, NSGL, Great Lakes, IL, TtNUS, Inc., March 20086.
- Record of Decision, Site 1 - Golf Course Landfill and Site 4 – Fire Fighting Training Unit, NSGL, Great Lakes, IL. Tetra Tech, February 16, 2011
- Remedial Design for LUCs and Long-Term Monitoring, Site 1 – Golf Course Landfill and Site 4 – Fire Fighting Training Unit, NSGL, Great Lakes, IL. NAVFAC Midwest, November 2012
- Operation and Maintenance Manual, Sites 1 – Golf Course Landfill and Site 4 – Fire Fighting Training Unit, NSGL, Great Lakes, IL. Tetra Tech, November 2012.
- Draft Final Long-Term Annual Groundwater Monitoring Report, June 2012 – March 2013, Site 1 – Golf Course Landfill and Site 4 – Fire Fighting Training Unit. NSGL, Great Lakes, IL. Tetra Tech, September 2013.

### **5.4.2 Monitoring Data Review**

The Navy has conducted groundwater monitoring at Site 1 since June 2012 to comply with federal and Illinois requirements for closure of landfills under RCRA. Groundwater monitoring is currently being conducted annually, but had previously been conducted quarterly. Data generated from groundwater sampling is evaluated by comparison of results to the State of Illinois TACO criteria or, in the absence of a TACO criterion, to the USEPA primary or secondary MCL.<sup>3</sup> Evaluation also includes comparison to previous rounds of groundwater monitoring and a trend analysis of the data. Round 7 of groundwater monitoring was completed in December 2013. Ten wells around Site 1 were sampled and samples were submitted to a laboratory for analysis of dioxins and furans, VOCs, SVOCs, herbicides, metals, chlorides, ammonia, alkalinity, biochemical oxygen demand, chemical oxygen demand, sulfates, nitrates, nitrites, TDS, and others. The following contaminants exhibited concentrations exceeding criteria during the most recent sampling event:

- One dioxin (1,2,3,4,6,7,8,9)-OCDD was detected in four samples at concentrations well below its USEPA Regional Screening Level (RSL).

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<sup>3</sup> TACO Tier 1 criteria are considered "To Be Considered" standards. Secondary MCLs are unenforceable goals related to water taste, odor, and color and are not ARARs unless promulgated by states.

- Iron and manganese were detected in unfiltered samples at concentrations exceeding TACO criteria in four samples. Barium, boron, calcium, cobalt, copper, magnesium, nickel, potassium, selenium, silver, sodium, and zinc were detected in at least one well at concentrations below criteria.
- Chloride was detected in two samples at concentrations greater than its TACO criterion.
- Phosphorous was detected in two samples at concentrations greater than its RSL criterion.
- Sulfate was detected in one sample at a concentration greater than its TACO criterion.
- TDS concentrations detected in 9 of 10 samples exceeded USEPA secondary MCL.
- Fluoride and nitrate were detected in several samples at concentrations that did not exceed TACO criteria.

Contaminant concentrations as compared to previous sampling results appear to be very similar to previous results, although dioxins and furans concentrations appear to be decreasing related to previous results. The Long Term Monitoring Report Round 7 was not available for this Five-Year Review. A summary of the most recent groundwater sampling data is provided in Appendix A.

#### **5.4.3 Site Visit and Inspection**

Site 1 was inspected on September 20, 2012, by Mr. Benjamin Simes from NAVFAC Midwest, Mr. Brian Conrath of the Illinois EPA, and Mr. Matt Mesarch and Mr. Ken Brown of Resolution Consultants. The vegetative cover (grass) was in overall good condition. Comments and issues were recorded on the site inspection checklist included in Appendix C. The ROD was approved in 2011 and the Remedial Design was approved in 2012, so the September 2012 inspection was the first annual inspection.

Site 1 was inspected on August 15, 2013, by Mr. Howard Hickey, and no instances of breaches of the LUCs were noted. No site deterioration or deficiencies were observed. A copy of the site inspection form is provided in Appendix C.

An interview was conducted with Mr. Benjamin Simes during the site inspection walkthrough conducted in September 2012. Mr. Simes provided a history of the site and responded to questions regarding the response actions taken at the property. Mr. Simes and other NAVFAC and contract Five-Year Review team members worked collaboratively to compile information, review site data, review the condition of the site, and assess the protectiveness of the remedy.

To supplement the information gathered by the Five-Year Review team, an interview was conducted with Mr. David E. Ohren, Golf Course Superintendent at the Willow Glen Golf Club on September 15, 2014. Mr. Ohren was asked about overall concerns or observations regarding the recent re-routing of the storm sewer, inspection activities at the golf course and the process for correcting deficiencies, and the level and types of inspections conducted. Highlights of the discussion are, as follows:

- Mr. Ohren was pleased with the changes in the golf course condition, as the replacement storm sewer has dramatically reduced the extent of flooding that they experience during times of high precipitation.

- There have been no significant areas of subsidence or erosion since the installation of the new storm sewer.
- The golf course has experienced no problems getting support for repair and maintenance on the landfill / golf course cover. If cover areas are identified that require work beyond what is done by the normal landscape contractor, the golf course simply submits a work order to Naval Station Great Lakes. Because the ERN program retains responsibility for the long-term care of the landfill, they do not have to secure funds in order to get the work done. There have been no problems with these routine requests for maintenance.
- The roles and responsibilities list from the O&M Plan was also discussed and several modifications are recommended. Three tasks ascribed to the golf course staff are actually not being performed. Golf course personnel are not inspecting the riprap layer in Skokie Creek and are not inspecting the abandoned storm sewer system. These are tasks that are better suited to Naval Station Great Lakes / MidLANT Project Management staff as part of the annual site inspection. In addition, the O&M Plan includes a requirement that golf course personnel prepare inspection reports for submittal to NAVFAC Midwest and Naval Station Great Lakes. This is not occurring, and there does not appear to be a need for this level of formality. It is recommended that the O&M Plan's roles and responsibilities list be reviewed and updated, as appropriate. These recommended changes have no impact on the protectiveness determination for the remedy at the site.
- Mr. Ohren did note that there has been some minor damage to the grass from the truck used to access the groundwater monitoring wells during winter sampling events. While there are no concerns with the contractors accessing the property, he asks that they consult with him regarding the best routes in/out in order to minimize damage to the grass.

## 5.5 Technical Assessment

The objective of the five-year review is to evaluate whether the RA implemented at a site will be protective of human health and the environment. The effectiveness of RAs is evaluated through comparison to the RAOs for each site. To provide a framework for organizing and evaluating data and information, and to ensure that all relevant issues are considered when evaluating the protectiveness of the remedy, the USEPA guidance lists three questions to consider:

### 5.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Document?

The selected remedy for Site 1 consists of four elements. Containment was achieved by maintaining the existing golf course soil and vegetative cover, which provide an equivalent final cover component as defined by landfill regulations cited in 25 IAC 807 that requires a minimum of 3 feet of low permeable soil cover on top of the impacted areas. The existing soil cover averages 6.5 feet in thickness. The remedy also includes re-routing of storm sewer lines to the landfill perimeter with the abandonment of lines that run through the landfill by grouting them closed. LUCs were incorporated into the Base Master Plan, which already restricted groundwater and surface water use, to also restrict disturbance of surface and subsurface soil and to prohibit residential development. The LUCs have also been recorded with the Navy's LUC Tracker system. The use restrictions agreed upon by the Navy and Illinois EPA include:

- Property Use Restriction – Site does not pose risk to human health and environment under light recreational use. Any residential use is prohibited.

- Groundwater Use Restriction – Installation of groundwater wells (other than environmental or monitoring wells) is prohibited to prevent exposure to contaminated groundwater. Sampling of groundwater from site's monitoring well network is currently conducted annually.
- Soil Disturbance Restriction – Excavation and uncontrolled removal of soil from below 18 inches at Golf Course without prior approval of Navy and Illinois EPA are prohibited.
- Maintenance of Landfill Cover – Landfill cover is required to be inspected on annual basis and maintained.

Current conditions indicate that the remedy, including the engineered cover and LUCs, is functioning as intended. The property is not being used in a manner inconsistent with the use restriction, groundwater is not being used for any purpose other than annual environmental monitoring, soil is not being disturbed, and the engineered cover is being maintained.

#### **5.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives Used at the Time of the Remedy Selection Still Valid?**

There have been no changes at the site (e.g., new contaminant sources, new ecological risks, or receptors) which would inhibit this remedy's protectiveness. The exposure assumptions, cleanup levels, and RAOs for this site have not changed and are still valid. ARARs were reviewed and it was determined that no changes have occurred that would impact protectiveness.

#### **5.5.3 Question C: Has any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?**

No additional information has been obtained that would call into question the protectiveness of the remedy. The ROD was signed in 2011 and Remedial Design were approved in 2012 so two annual inspections have been completed for the site. The existing land use restrictions are effective in protecting human health and the environment while concentrations of the COCs exceed the cleanup criteria.

### **5.6 Issues**

No issues identified at Site 1 during the Five-Year Review process.

### **5.7 Recommendations**

The recommendations and follow-up actions identified in the Five-Year Review process for Site 1 are summarized in the table below.

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Site 1 – Golf Course Landfill						
Update O&M Plan Roles and Responsibilities	* Assign riprap and abandoned storm sewer inspections to NAVSTA Great Lakes Project Manager as part of annual site inspection. * Remove requirement that golf course personnel prepare reports for submission to NAVSTA Great Lakes	NAVFAC	Illinois EPA	12/30/14	N	N

## 5.8 Protectiveness Statements

The remedy at Site 1 is protective of human health and the environment.

No unacceptable risks exist at the site from impacted soil, groundwater or vapor, as applicable exposure pathways are being controlled by the remedy. LUCs serve as the remedy at the site by restricting property and groundwater use, maintaining the ground cover, and requiring annual inspections to ensure the continuation and enforcement of the LUCs. Groundwater monitoring is being conducted in accordance with Illinois EPA landfill closure requirements.

In addition, NSGL lies within an area comprised of relatively impermeable till material, with relatively low hydraulic conductivities, and groundwater as a drinking water source is prohibited by Navy directive.

## 6.0 Site 4 – Former Fire Fighting Training Unit (FFTU)

The Site 1 and 4 ROD was signed in 2011. This five-year review of Site 4 is required by statute because hazardous substances, pollutants, or contaminants remain on site that do not allow for UU/UE. The location of Site 4 is shown on Figure 1-2 and the layout of Site 4 is shown on Figure 5-1. The remedy for Site 4 is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. A soil cover over the former Fire Fighting Training Unit (FFTU) prevents direct contact between humans or animals and the contaminated soil. Access to the site is not restricted, however LUCs were implemented in 2011 to restrict future use of the site, prohibit installation of groundwater wells other than for environmental sampling, and require annual inspections of the site to ensure LUCs are continuing to be implemented. The remedy in place continues to be protective of human health and the environment.

### 6.1 Site Chronology – Table 6

The following table presents the chronology for the key events at Site 4.

Event	Date
Initial Assessment Study	1986
Technical Memorandum on the Remedial Investigation Verification Step	1991
Investigations and Removal of Tanks and Fuel Lines and Demolition Services	1996 - 1997
Bioremediation of Contaminated Soil in Biopiles	1997 - 1998
RI Report for Site 4	1998
Investigation of Former Sludge Pit	2000
FS for Sites 1 and 4	2009
ROD for Sites 1 and 4 completed	September 2010
ROD for Sites 1 and 4 Signature	January 2011
Remedial Design for Sites 1 and 4	November 2012
Groundwater Monitoring Events for Sites 1 and 4	June 2012 - present

## 6.2 Background

### 6.2.1 Physical Setting

Site 4 is located in the northwest portion of NSGL where the current Willow Glen Golf Course exists and was the location of the former FFTU. The northwest portion of NSGL is nonresidential and is not environmentally sensitive. Site 4 occupies approximately 10 acres east of the Skokie Ditch, near the center of the golf course and is bordered on all sides by the golf course. The golf course maintenance facility is located in the area of the FFTU. (Tetra Tech 2011). The site is illustrated in Figure 6-1.

Regional aquitards formed by glacial till are present beneath Site 4. These aquitards are expected to limit downward migration of contaminants into deeper groundwater aquifers. Shallow groundwater, typically encountered at Site 4 between 1 and 17 feet bgs, is likely to be discontinuous across the site and is expected to have only limited lateral migration potential because of the geological profile across Site 4 (Tetra Tech 2011).

### **6.2.2 Land and Resource Use**

Site 4 was a 10-acre FFTU which was used between 1942 and 1989 to train naval recruits in the fundamentals of firefighting. The former FFTU was located near the center of the 18-hole Willow Glen Golf Course. The current golf course is owned and operated by the Navy and used by facility personnel and people from the surrounding area. Properties immediately adjacent to the golf course are generally commercial, industrial or open space. Residential properties are located within an eighth of a mile to the north, east, south and west of the site. The future use of the surrounding land and of Site 4 as a golf course is not expected to change.

Several wells within a 3-mile radius of Site 4 were historically used as a drinking water supply and agricultural wells. No water supply intakes from free-flowing or static water bodies are located within 3 miles of Site 4. Drinking water is supplied from Lake Michigan about 10 miles from the active Site 4 boundary (Doc: GL 000004, Site Inspection form March 16, 1988). The installation of groundwater wells (other than environmental monitoring wells) at the Site 4 is prohibited to prevent the consumption of groundwater (Document 000343).

### **6.2.3 History of Contamination**

The primary source of contamination to subsurface soil and groundwater at Site 4 is attributed to petroleum products (diesel fuel and gasoline) that were stored onsite and used during firefighting training exercises. COCs included PAHs and VOCs in subsurface soil and metals, PAHs and VOCs in groundwater.

Fuels in open burn pits, concrete carrier compartments and gasoline burning compartments were ignited to simulate fires. Fuels were transported to the site through pressurized underground piping. Unburned fuels and wastewater were drained from the burn area and treated using separators and decant ponds on the western side of the FFTU. Treated wastewater and storm water discharged through a storm sewer into Skokie Creek, approximately 0.25 miles west and south of the site.

Soil and groundwater at Site 4 were contaminated with fuel oil, gasoline, and undetermined accelerants/fuels. Contamination has been attributed to the former pressurized piping system, former underground storage tanks (USTs), sludge pits, and firefighting exercises.

The piping and subsurface vaults, tanks, pits, sludge pits, soil, and other features were successfully removed, sorted, and characterized for appropriate disposal and/or treated on site. Biopiles were constructed on site in accordance with a pre-approved remediation design to treat petroleum contaminated soil using ex-situ bioremediation techniques. As identified in subsequent investigations some residual soil contamination remained at the site following cleanup activities.

### **6.2.4 Initial Response**

During the 1986 Initial Assessment Study, Site 4 was identified as an area where further investigation was recommended to confirm or refute the presence of suspected contamination. In 1991, an investigation of soil, surface water, and groundwater was conducted. Sample analytical results had elevated concentrations of petroleum hydrocarbons in soil and detected oil and grease in shallow groundwater.

In 1997, the piping and subsurface vault, tanks pits, sludge pits, soil, and other features were successfully removed, sorted, and characterized for appropriate off-site disposal or onsite

treatment. Biopiles were constructed onsite to treat petroleum-contaminated soil using ex-situ bioremediation techniques. The biopile remediation was completed in 1998.

In 1998, a RI was conducted following the removal of underground piping, contaminated soil, and an UST. During the 1998 RI, 205 subsurface soil samples, 53 groundwater samples, 4 surface water, and 4 sediment samples were collected at Site 4 and a TACO Tier 2 analysis was conducted. Laboratory results indicated the presence of PAHs and VOCs in soil and groundwater samples at concentrations exceeding the Illinois EPA TACO Tier 1 Residential Groundwater Remediation Objectives (GRO). The TACO Tier 2 analysis predicted that contamination would not migrate off-site at concentrations exceeding Tier 1 PRGs. A RI of soil in the former FFTU sludge pit that was conducted in 2000 confirmed the presence of inorganics in soil at concentrations that exceeded TACO Tier 1 Soil Remedial Objectives (SROs) for residential properties but were less than Tier 2 objectives.

In 2009, a focused FS evaluated alternatives including the use of containment, monitoring and LUCs for Site 4 to eliminate unacceptable risks associated with leaving waste and contaminated media in place.

#### **6.2.5 Basis for Taking Action**

The HHRA that was prepared in 2008 as part of the Remedial Investigation for Site 1 provided an overall estimate of human health risks at the site but did not utilize data from the FFTU area because the depths of the samples had changed significantly since collection. A clean soil cover was placed over the FFTU area during the reconstruction of the golf course in 2003. Therefore, the estimated depth to these historical soil samples is at least 8 feet below the current ground surface and the likelihood of direct contact is minimal.

There was uncertainty in risk estimates developed for Site 1 by not including the data from the FFTU area. The HHRA assumed that receptors would be directly exposed to subsurface soil (i.e., assuming that subsurface soil is excavated and brought to the surface) and groundwater contamination. To evaluate this uncertainty and possible exposure to subsurface soil and groundwater at the FFTU, supplemental risk estimates were calculated.

Subsurface soil samples were collected from the FFTU area in 1997, 1998, and 1999. The only receptor realistically expected to be exposed to subsurface soil at Sites 1 and 4 is the future construction worker. Therefore, risks at the FFTU were evaluated for this receptor. Using the maximum concentrations, the following chemicals were identified as COPCs for the FFTU: benzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene. Risk estimates for the construction worker based exposure to maximum detected concentrations found that the total cancer risk is less than the USEPA and Illinois EPA goal of  $1 \times 10^{-6}$  and the noncarcinogenic hazard indices meet the goal of 1 on a target organ basis. In addition to construction workers, risk estimates hypothetical future residents

Risks from hypothetical future residential use of the property were also calculated using FFTU data with the assumption that receptors would be exposed to subsurface soil that would have been brought to the surface in the future. Risks were found to be within USEPA's target risk range,  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ , but exceeded the Illinois EPA goal of  $1 \times 10^{-6}$ , with risks mainly due to exposure to PAHs. HIs for the hypothetical future receptors were found to be less than the USEPA and Illinois EPA goal of 1.

Exposure to groundwater from the FFTU area was also considered. Data from 1998 showed concentrations of benzene (73 µg/L) and naphthalene (31 µg/L) in excess of USEPA MCLs and Illinois EPA Residential Tier 1 Remediation Objectives for Class 1 Groundwater. These concentrations correspond to an approximate cancer risk of  $2 \times 10^{-4}$  for benzene and a noncarcinogenic HI of 5 for naphthalene assuming future residential use of groundwater and exposure by ingestion and inhalation. Hypothetical inhalation risks were found to be well below regulatory levels.

Contaminated soil is to remain in place at Site 4. Without proper control, the contaminated soil has the potential to contaminate the following site media: subsurface soil, sediment, groundwater, and surface water. Groundwater ingestion could result in an unacceptable carcinogenic and noncarcinogenic risks; therefore controls are necessary to prohibit potable use of groundwater.

The contaminants associated with past firefighting training activities in each media include the following:

#### **Subsurface Soil**

- VOCs were generally detected in subsurface soil samples at concentrations less than applicable human health and ecologic screening criteria. However, four sampling locations were found to contain levels of benzene in excess of the Illinois EPA TACO SRO for Residential Properties – Inhalation
- PAHs were detected in subsurface soil samples at concentrations that exceeded applicable human health and/or ecologic screening criteria.
- Pesticides, PCBs, and herbicides were not detected in subsurface soil samples.
- Subsurface soil samples at Site 4 were not analyzed for dioxin/furans or metals.

#### **Sediment**

- VOCs, PAHs, pesticides, PCBs, and herbicides were not detected in sediment samples.
- Sediment samples at Site 4 were not analyzed for dioxin/furans or metals.

#### **Groundwater**

- Groundwater data from 1998 found concentrations of benzene (73 µg/L) and naphthalene (31 µg/L) at concentrations that exceeded USEPA MCLs and Illinois EPA Residential Tier 1 Remediation Objectives for Class 1 Groundwater. PAHs were detected in groundwater samples at concentrations that exceeded applicable human health and/or ecologic screening criteria.
- Pesticides, PCBs, and herbicides were not detected in groundwater samples.
- Groundwater samples at Site 4 were not analyzed for dioxin/furans or metals.

#### **Surface Water**

- VOCs were detected in surface water samples at concentrations less than applicable human health and ecologic screening criteria, with the exception of two surface water samples that had vinyl chloride concentrations greater than a drinking water screening criterion. Vinyl chloride was detected in two samples above the USEPA Region 9 Tap Water PRG of 0.02 µg/L.

- PAHs, pesticides, PCBs, and herbicides were not detected in surface water samples.
- Because of the location of Site 4 with respect to Site 1, the surface water data presented for Site 4 is that same data that is presented for Site 1.
- Surface water samples at Site 4 were not analyzed for dioxin/furans or metals.

## **6.3 Remedial Actions**

### **6.3.1 Remedy Selection**

The ROD for Site 1 and Site 4 was signed in January 2011 (Tetra Tech, 2011). The principal factors influencing selection of the remedy included:

- The remedy should be implemented in a short time frame, and be protective of human health and the environment, be cost-effective, and will result in a permanent solution to the maximum extent practicable.
- The remedy should be consistent with the current and reasonably anticipated future recreational use of the site.

The selected remedy included the use of LUCs to prevent access to remaining soil contamination and to maintain the existing engineered barrier. The following LUCs were implemented to achieve objectives:

- Property Use Restriction - Site 4 does not pose a threat to human health or the environment under an industrial/commercial land use scenario. Residential use of the property is prohibited.
- Groundwater Use Restriction - The installation of groundwater wells (other than environmental evaluation or monitoring wells) is prohibited to prevent exposure to contaminated groundwater. In addition, the installation of groundwater wells (other than environmental evaluation or monitoring wells) is prohibited in all geographic areas of Naval Station Great Lakes by Naval Station Great Lakes Instruction 11130.1 (Ground Water Use Restrictions).
- Soil Disturbance Restriction - The excavation and uncontrolled removal of soil from Site 4 without prior review of work plans by the Navy and the Illinois EPA is prohibited. These reviews are necessary to ensure adequate worker health and safety precautions and to confirm proper management of contaminated materials.
- Maintenance of Soil Cover – A soil cover is present at the site to prevent exposure to contaminated soil. This cover will be inspected and maintained.

### **6.3.2 Remedy Implementation**

No source materials consisting of principle threat wastes (as defined in USEPA, 1991) are present at Site 4. Source materials present at Site 4 as residual soil contamination have been covered and have remained relatively undisturbed and stable for several decades. The risk assessment determined that the source materials present at Site 4 do not present a significant risk to human health or the environment based on the current site use.

Since Site 4 is located within the footprint of Site 1, the remedy activities implemented for Site 1 also apply to Site 4. The ROD documents the following remedies selected as presumptive remedy for soil, groundwater, and sediment contamination:

- Placement of riprap layer of a limited area in the Skokie Ditch to address PAH contamination which was completed in 2011;
- Abandonment and replacement of damaged piping in Skokie Ditch and the relocation of a storm water sewer to the perimeter of Site 1 which was completed in 2011;
- A cover over the contaminated soil to prevent surface receptors from contact with contaminated soil;
- Institutional controls to restrict use of land and groundwater;
- Groundwater monitoring to satisfy Illinois EPA site closure requirements; and
- Routine inspections and maintenance of the cover, sediment controls and piping in the Skokie Ditch, and institutional controls to ensure continued integrity.

### **6.3.3 System Operations/O&M**

In accordance with the LUC Implementation Plan that is part of the LUCMOA between the Illinois EPA and Navy dated June 1, 2005, annual inspections of Site 4 are required. As part of the Remedial Design, an O&M plan was prepared in November 2012 to guide post-closure inspection and maintenance of the site must be implemented. The O&M at Site 4 includes the following:

- Post-closure care and reporting at Site 4 must be performed annually for 30 years in accordance with the IAC Title 35, Subtitle G, Chapter 1, Subchapter I, Parts 807-811.
- Groundwater sampling and analysis must be performed in accordance with the Sampling and Analysis Plan (Tetra Tech 2012) and must meet the requirements of 35 IAC 620; and
- Annual inspection and maintenance of vegetative cover system, abandoned storm sewer system, and groundwater monitoring wells in accordance with the O&M plan (November 2012).

Groundwater monitoring has been conducted by sampling ten monitoring wells at Sites 1 and 4. Groundwater samples collected from the monitoring wells were submitted to a laboratory for analysis of VOCs, pesticides, SVOCs, PCBs, dioxins and furans, metals, and other chemicals. Groundwater monitoring was completed in June, September, and December 2012; March, June, September/October, and December 2013; and March and June 2014.

## **6.4 Five-Year Review Process**

Site 4 is part of a comprehensive environmental investigation and cleanup program that has been performed at NSGL under CERCLA authority. The site is currently in the long-term monitoring phase of the CERCLA process.

### **6.4.1 Document Review**

The following documents were reviewed for Site 4 (FFTU):

- Fire Fighting Training Unit Remedial Investigation Report, Naval Training Center Great Lakes, Great Lakes IL, Beling Consultants, Inc., July 1998
- Delivery Order Completion Report, Remedial Investigation of Soil, Former FFTU Sludge Pit at Naval Training Center, Great Lakes, IL, TolTest, February 2000
- Remedial Investigation and Risk Assessment Report, Site 1 – Golf Course Landfill, NSGL, Great Lakes, IL, TtNUS. March 2006
- Record of Decision, Site 1 - Golf Course Landfill and Site 4 – Fire Fighting Training Unit, NSGL, Great Lakes, IL. Tetra Tech, February 16, 2011
- Remedial Design for LUCs and Long-Term Monitoring, Site 1 – Golf Course Landfill and Site 4 – Fire Fighting Training Unit, NSGL, Great Lakes, IL. Tetra Tech, November 2012
- Operation and Maintenance Manual, Site 1 – Golf Course Landfill and Site 4 – Fire Fighting Training Unit, Naval Station Great Lakes, Great Lakes, IL. NAVFAC Midwest, November 2012.

#### **6.4.2 Monitoring Data Review**

The Navy has conducted groundwater monitoring around the periphery of Site 1 since June 2012 to comply with federal and Illinois requirements for closure of landfills under RCRA. Groundwater monitoring is currently being conducted annually, but had previously been conducted quarterly. Data generated from groundwater sampling is evaluated by comparison of results to the State of Illinois TACO criteria or, in the absence of a TACO criterion, to the USEPA primary or secondary MCL.<sup>4</sup> Evaluation also includes comparison to previous rounds of groundwater monitoring and a trend analysis of the data. Round 7 of groundwater monitoring was completed in December 2013. No monitoring wells are near Site 4 but ten wells around Site 1 were sampled and samples were submitted to a laboratory for analysis of dioxins and furans, VOCs, SVOCs, herbicides, metals, chlorides, ammonia, alkalinity, biochemical oxygen demand, chemical oxygen demand, sulfates, nitrates, nitrites, TDS, and others. The following contaminants exhibited concentrations exceeding criteria during the most recent sampling event:

- One dioxin (1,2,3,4,6,7,8,9)-OCDD was detected in four samples at concentrations well below its USEPA Regional Screening Level (RSL).
- Iron and manganese were detected in unfiltered samples at concentrations exceeding TACO criteria in four samples. Barium, boron, calcium, cobalt, copper, magnesium, nickel, potassium, selenium, silver, sodium, and zinc were detected in at least one well at concentrations below criteria.
- Chloride was detected in two samples at concentrations greater than its TACO criterion.
- Phosphorous was detected in two samples at concentrations greater than its RSL criterion.
- Sulfate was detected in one sample at a concentration greater than its TACO criterion.

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<sup>4</sup> TACO Tier 1 criteria are considered "To Be Considered" standards. Secondary MCLs are unenforceable goals related to water taste, odor, and color and are not ARARs unless promulgated by states.

- TDS concentrations detected in 9 of 10 samples exceeded USEPA secondary MCL.
- Fluoride and nitrate were detected in several samples at concentrations that did not exceed TACO criteria.

Contaminant concentrations as compared to previous sampling results appear to be very similar to previous results, although dioxins and furans concentrations appear to be decreasing related to previous results. The Long Term Monitoring Report Round 9 was not available for this review. A summary of the most recent groundwater sampling data is provided in Appendix A.

### **6.4.3 Site Visit and Inspection**

Site 4 was inspected on September 20, 2012, by Mr. Benjamin Simes from NSGL, Mr. Brian Conrath of the Illinois EPA, and Mr. Matt Mesarch and Mr. Ken Brown of Resolution Consultants. The vegetative cover (grass) was in overall good condition. Comments and issues were recorded on the site inspection checklist included in Appendix C. The ROD was approved in 2011 and the Remedial Design was approved in 2012, so the September 2012 inspection was the first annual inspection.

Sites 1 and 4 were inspected on August 15, 2013 by Mr. Howard Hickey, and no instances of breaches of the LUCs were noted. No site deterioration or deficiencies were observed. A copy of the site inspection form is provided in Appendix C.

An interview was conducted with Mr. Benjamin Simes during the site inspection walkthrough conducted in September 2012. Mr. Simes provided a history of the site and responded to questions regarding the response actions taken at the property. Mr. Simes and other NAVFAC and contract Five-Year Review team members worked collaboratively to compile information, review site data, review the condition of the site, and assess the protectiveness of the remedy.

To supplement the information gathered by the Five-Year Review team, an interview was conducted with Mr. David E. Ohren, Golf Course Superintendent at the Willow Glen Golf Club on September 15, 2014. Mr. Ohren was asked about overall concerns or observations regarding the recent re-routing of the storm sewer, inspection activities at the golf course and the process for correcting deficiencies, and the level and types of inspections conducted. Highlights of the discussion are, as follows:

- Mr. Ohren was pleased with the changes in the golf course condition, as the replacement storm sewer has dramatically reduced the extent of flooding that they experience during times of high precipitation.
- There have been no significant areas of subsidence or erosion since the installation of the new storm sewer.
- The golf course has experienced no problems getting support for repair and maintenance on the landfill / golf course cover. If cover areas are identified that require work beyond what is done by the normal landscape contractor, the golf course simply submits a work order to Naval Station Great Lakes. Because the ERN program retains responsibility for the long-term care of the landfill, they do not have to secure funds in order to get the work done. There have been no problems with these routine requests for maintenance.
- The roles and responsibilities list from the O&M Plan was also discussed and several modifications are recommended. Three tasks ascribed to the golf course staff are actually not

being performed. Golf course personnel are not inspecting the riprap layer in Skokie Creek and are not inspecting the abandoned storm sewer system. These are tasks that are better suited to NSGL / MidLANT Project Management staff as part of the annual site inspection. In addition, the O&M Plan includes a requirement that golf course personnel prepare inspection reports for submittal to NAVFAC Midwest and Naval Station Great Lakes. This is not occurring, and there does not appear to be a need for this level of formality. It is recommended that the O&M Plan's roles and responsibilities list be reviewed and updated, as appropriate. These recommended changes have no impact on the protectiveness determination for the remedy at the site.

- Mr. Ohren did note that there has been some minor damage to the grass from the truck used to access the groundwater monitoring wells during winter sampling events. While there are no concerns with the contractors accessing the property, he asks that they consult with him regarding the best routes in/out in order to minimize damage to the grass.

## **6.5 Technical Assessment**

The objective of the five-year review is to evaluate whether the RA implemented at a site will be protective of human health and the environment. The effectiveness of RAs is evaluated through comparison to the RAOs for each site. To provide a framework for organizing and evaluating data and information, and to ensure that all relevant issues are considered when evaluating the protectiveness of the remedy, the USEPA guidance lists three questions to consider:

### **6.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Document?**

The selected remedy for Site 4 consists of four elements. Containment was achieved by maintaining the existing soil and vegetative cover that averages 6.5 feet thick. LUCs were incorporated into the Base Master Plan, which already restricted groundwater and surface water use, to also restrict disturbance of surface and subsurface soil and to prohibit residential development. The LUCs have also been recorded with the Navy's LUC Tracker system. The use restrictions agreed upon by the Navy and Illinois EPA include:

- Property Use Restriction – Site does not pose risk to human health and environment under light recreational use. Any residential use is prohibited.
- Groundwater Use Restriction – Installation of groundwater wells (other than environmental or monitoring wells) is prohibited to prevent exposure to contaminated groundwater. Sampling of groundwater from site's monitoring well network is currently conducted quarterly.
- Soil Disturbance Restriction – Excavation and uncontrolled removal of soil from below 18 inches at former FFTU without prior approval of Navy and Illinois EPA are prohibited.
- Maintenance of Cover – The cover is required to be inspected on annual basis and maintained.

Current conditions indicate that the remedy, including the engineered cover and LUCs, is functioning as intended. The property is not being used in a manner inconsistent with the use restriction, groundwater is not being used for any purpose other than annual environmental monitoring, soil is not being disturbed, and the engineered cover is being maintained.

### 6.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives Used at the Time of the Remedy Selection Still Valid?

There have been no changes at the site (e.g., new contaminant sources, new ecological risks, or receptors) which would inhibit this remedy's protectiveness. The exposure assumptions, cleanup levels, and RAOs for this site have not changed and are still valid. ARARs were reviewed and it was determined that no changes have occurred that would impact protectiveness.

### 6.5.3 Question C: Has any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?

No additional information has been obtained that would call into question the protectiveness of the remedy. The ROD was signed in 2011 and Remedial Design were approved in 2012 so two annual inspections have been completed for the site. No additional information has been identified that would call into question the protectiveness of the remedy. The existing land use restrictions are effective in protecting human health and the environment while concentrations of the COCs exceed the cleanup criteria.

## 6.6 Issues

No issues identified at Site 4 during the Five-Year Review process

## 6.7 Recommendations

The recommendations and follow-up actions identified in the Five-Year Review process for Site 4 are summarized in the table below.

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Site 4 – Fire Fighting Training Unit						
Update O&M Plan Roles and Responsibilities	* Assign riprap and abandoned storm sewer inspections to NAVSTA Great Lakes Project Manager as part of annual site inspection. * Remove requirement that golf course personnel prepare reports for submission to NAVSTA Great Lakes	NAVFAC	Illinois EPA	12/20/14	N	N

## 6.8 Protectiveness Statements

The remedy at Site 4 is protective of human health and the environment.

No unacceptable risks exist at the site from impacted soil, groundwater or vapor, as applicable exposure pathways are being controlled by the remedy. LUCs serve as the remedy at the site and

restrict property and groundwater use, require maintenance of the ground cover, and require annual inspections to ensure the continuation and enforcement of the LUCs. Groundwater monitoring associated with Site 1 is being conducted in accordance with Illinois EPA landfill closure requirements.

The golf course maintenance facility is located on Site 4. The soil cover prevents direct contact between humans or animals and any residual contamination. In addition, NSGL lies within an area comprised of relatively impermeable till material, with relatively low hydraulic conductivities, and groundwater as a drinking water source is prohibited by Navy directive.

## 7.0 Site 19 – Small Arms Range 910

The Site 19 ROD was signed in 2014. This five-year review of Site 19 is required by statute because hazardous substances, pollutants, or contaminants remain on site that do not allow for UU/UE. The location of Site 19 is shown on Figure 1-2 and the layout of Site 19 is shown on Figure 7-1. The remedy for Site 19 is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. A soil cover over the former Small Arms Range (Former Building 910) prevents direct contact between humans or animals and the contaminated soil. Access to the site is not restricted, however LUCs were implemented in 2014 to restrict future use of the site, prohibit installation of groundwater wells other than for environmental sampling, and require annual inspections of the site to ensure LUCs are continuing to be implemented. The remedy in place continues to be protective of human health and the environment.

### 7.1 Site Chronology – Table 7

The following table presents the chronology for the key events at Site 19.

Event	Date
Initial Assessment Study	1986
Pre-Demolition Hazardous Materials Investigation	1998
RI/RA Report	2010
Focused Feasibility Study	2012
Proposed Plan	2012
Record of Decision Completed	August 2013
Record of Decision Signature	February and April 2014

## 7.2 Background

### 7.2.1 Physical Setting

Site 19 is the location of the former Recruit Training Center Rifle Range housed within Building 910. The site is bounded on the north by 4<sup>th</sup> Avenue, on the east by Ohio Street, and on the south and west by grass and concrete associated with other buildings. Site 19 is currently a vacant, grassy area. Figure 7-1 is an aerial site photograph from June 2015. A former dry cleaning operation was located approximately 50 feet southwest of Site 19.

Regional aquitards formed by glacial till are present beneath Site 19. These aquitards are expected to limit downward migration of contaminants into deeper groundwater aquifers. Shallow groundwater, typically encountered at Site 19 between 1 and 17 feet bgs, is likely to be discontinuous across the site and is expected to have only limited lateral migration potential because of the geological profile observed at Site 19 (Tetra Tech NUS 2010).

### 7.2.2 Land and Resource Use

NSGL covers 1,632 acres in Lake County, Illinois, along the lakeshore of Lake Michigan. Naval Station Great Lakes administers base operations and provides facilities and related support to training activities (including the U.S. Navy's only boot camp) as well as a variety of other military commands located on base. A variety of land uses currently surround NSGL. Along the northern boundary of the base are highly urbanized and industrial areas. Much of the land beyond the

northwestern site boundary comprises unincorporated lands of Lake County and is vacant except for scattered retail and residential properties. Adjacent to the western boundary are primarily industrial properties, and along the southern boundary is a mixture of public open space and residential land.

Site 19 was an indoor shooting range that operated between 1942 and 1997 and was demolished in 2000. Approximately 340,000 rounds of small arms ammunition (.22 caliber, .45 caliber, and 12 gauge) per year were delivered from the armory to the rifle range. Spent ammunition was collected from the floor of the range and deposited into 22-gallon cans. This waste spent ammunition was collected by the Defense Reutilization and Marketing Office once every 2 to 3 months.

### **7.2.3 History of Contamination**

It is estimated that 19 million pounds of ammunition were generated by this facility, providing the potential for lead to have impacted site soil and groundwater. Chemicals used at the range include CLP brand cleaner (20 cases per year) and bore cleaner. These chemicals are primarily composed of petroleum products and distillates (i.e., VOCs and PAHs) and were used on rags, with most of the chemical evaporating. Rags were reused for as long as possible and then disposed of in facility dumpsters along with the empty chemical cans or bottles. The use of these chemicals provides the potential for VOCs and PAHs to have impacted site soil and groundwater.

A dry cleaning facility was located just southwest of former Building 910. Dry cleaning operations were active for over 50 years and ended in 2008. A Resource Conservation and Recovery Act (RCRA) storage unit and tanks were located at the northern end of the dry cleaning facility approximately 80 feet southwest of Site 19. Soil contamination associated with the dry cleaning operation has been documented, and these contaminants (i.e., chlorinated VOCs and their byproducts) may be present in soil and groundwater at Site 19. Although the quantity of solvents used at the dry cleaning facility is unknown, it is known that no more than 1,200 gallons of spent tetrachloroethene (PCE) were stored at the dry cleaning facility at any given time.

### **7.2.4 Initial Response**

Initial assessment activities at Site 19 included soil sampling conducted near the former building in 1998. The TCLP analysis of the samples for lead indicated that leachable lead levels in soil were above disposal criteria. In 2001, soil samples were collected on Lake County property just north of Site 19, one of which had lead and PAH concentrations exceeding residential and industrial criteria.

RI field activities for Site 19 were conducted in 2008, and consisted of surface and subsurface soil sampling, installation of two temporary monitoring wells, groundwater sampling of these monitoring wells, and aquifer testing of the two temporary monitoring wells.

Surface and subsurface soil samples were collected to provide information on the horizontal and vertical extent of constituents, primarily lead, in the area where Building 910 was located. A total of 20 soil borings were advanced to 12 feet bgs using direct-push technology (DPT) methods. Two monitoring wells were installed at Site 19 during the RI with screened intervals between 5 and 15 feet bgs (TtNUS 2010). Groundwater samples collected from the two monitoring wells exhibited metals and PAHs at concentrations exceeding minimum screening criteria.

### **7.2.5 Basis for Taking Action**

Seven PAHs were detected in soil at concentrations greater than minimum screening criteria [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene, and naphthalene]. Thirteen metals (aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, and nickel) were detected in soil at concentrations exceeding minimum screening criteria. Very few VOCs were detected in soil and groundwater samples from Site 19, and detections did not exceed screening criteria.

Groundwater samples collected from the two monitoring wells exhibited metals (arsenic) and PAHs (benzo(a)anthracene, benzo(a)pyrene, and dibenzo(a,h)anthracene) at concentrations exceeding minimum screening criteria.

## **7.3 Remedial Actions**

A comparative evaluation of remedial alternatives was completed in 2013 and documented in the Focused Feasibility Study (Tetra Tech 2013). The alternative including land use controls was implemented based on the Record of Decision (Tetra Tech 2014).

### **7.3.1 Remedy Selection**

Several remedial alternatives were screened and evaluated in the Focused Feasibility Study (Tetra Tech 2012), which developed an appropriate range of remediation technologies and options that were used to develop remedial alternatives. The preliminary screening of remediation technologies and process options was based on overall applicability to the medium of concern, COCs, and specific conditions present at the Site. The screening of remedial technologies and options included the following alternatives:

- No Action
- Land Use Controls (LUC)
- Removal of Contaminated Soil

### **7.3.2 Remedy Implementation**

No source materials consisting of principle threat wastes (as defined in USEPA, 1991) are present at Site 19. Source materials present at Site 19 as residual soil contamination have been covered and have remained relatively undisturbed and stable. The risk assessment determined that the source materials present at Site 19 do not present a significant risk to human health or the environment based on the current site use.

The ROD documents the following remedies selected as presumptive remedy for soil and groundwater contamination:

- Incorporation of LUCs into the Base Master Plan (which already restricts groundwater and surface water use) to also restrict disturbance of surface and subsurface soil, and to prohibit residential development, and
- Implementation of Five-Year Reviews to make sure that LUCs remain protective of human health.

### **7.3.3 System Operations/O&M**

In accordance with the LUC Implementation Plan that is part of the LUCMOA between the Illinois EPA and Navy dated June 1, 2005, annual inspections of Site 19 are required. The LUC Implementation Plan guides post-closure inspection and maintenance of the site. The O&M at Site 19 includes the following:

- Post-closure care and reporting at Site 19 must be performed annually.
- Annual inspection and maintenance of vegetative cover in accordance with the LUC Implementation Plan.

## **7.4 Five-Year Review Process**

### **7.4.1 Document Review**

The following documents were reviewed for Site 19:

- Remedial Investigation and Risk Assessment Report, Site 19 Small Arms Range 910, NSGL, Great Lakes, Illinois. TtNUS, July 2010.
- Proposed Plan for Site 19 Small Arms Range 910, NSGL, Installation Restoration Program, Great Lakes, Illinois. 2013.
- Record of Decision for Site 19 – Small Arms Range 910, NSGL, Great Lakes, Illinois. TtNUS, 2013.
- Illinois EPA Approval of Record of Decision for Site 19 – Small Arms Range 910, NSGL, Illinois. April 18, 2014.

### **7.4.2 Monitoring Data Review**

There is no long-term monitoring associated with Site 19, other than annual LUC site inspections of the engineered barrier.

### **7.4.3 Site Visit and Inspection and Interview**

A site visit was not conducted as part of this Five-Year Review with Sites 22, 3, 2, 1, and 4 but site visits and inspections have been conducted during annual LUC site inspections by the Navy and Illinois EPA since 2014. According to the Navy, the LUC site inspection documents did not identify issues at Site 19.

## **7.5 Technical Assessment**

The objective of the five-year review is to evaluate whether the RA implemented at a site is protective of human health and the environment. The effectiveness of RAs is evaluated through comparison to the RAOs for each site. To provide a framework for organizing and evaluating data and information, and to ensure that all relevant issues are considered when evaluating the protectiveness of the remedy, the USEPA guidance lists three questions to consider:

### **7.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Document?**

The selected remedy for Site 19 consists of two elements.

- Incorporation of LUCs into the Base Master Plan (which already restricts groundwater and surface water use) to also restrict disturbance of surface and subsurface soil, and to prohibit residential development, and
- Implementation of Five-Year Reviews to make sure that LUCs remain protective of human health.

Current conditions indicate that the remedy, including the LUCs, is functioning as intended. The property is not being used in a manner inconsistent with the use restriction, groundwater is not being used for any purpose other than annual environmental monitoring, soil is not being disturbed, and the site is currently vacant.

### **7.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives Used at the Time of the Remedy Selection Still Valid?**

There have been no changes at the site (e.g., new contaminant sources, new ecological risks, or receptors) which would inhibit this remedy's protectiveness. The exposure assumptions, cleanup levels, and RAOs for this site have not changed and are still valid. ARARs were reviewed and it was determined that no changes have occurred that would impact protectiveness.

### **7.5.3 Question C: Has any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?**

No additional information has been obtained that would call into question the protectiveness of the remedy. The ROD was signed in 2014 and the first annual inspection was completed for the site. No additional information has been identified that would call into question the protectiveness of the remedy. The existing land use restrictions are effective in protecting human health and the environment while concentrations of the COCs exceed the cleanup criteria.

## **7.6 Issues**

During the Five-Year Review process, it was determined that two monitoring wells remain at the site.

## **7.7 Recommendations**

The recommendations and follow-up actions identified in the Five-Year Review process for Site 19 are summarized in the table below.

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Site 19, Small Arms Range 910						
Monitoring wells from the investigation are still in place	Properly abandon all wells on the site	Navy	Illinois EPA	30 Dec 2016	N	N

## 7.8 Protectiveness Statements

The remedy at Site 19 is protective of human health and the environment.

No unacceptable risks exist at the site from impacted soil, groundwater, or vapor, as applicable exposure pathways are being controlled by the remedy. To address any residual contamination that could be present above Illinois EPA TACO criteria, LUCs serve as the remedy by restricting property use and requiring annual inspections to ensure the continuation and enforcement of the LUCs. The implemented remedial action continues to meet RAOs.

Specifically there are no buildings at Site 19. NSGL lies within an area comprised of relatively impermeable till material, with relatively low hydraulic conductivities, and groundwater as a drinking water source is prohibited by Navy directive.

## 8.0 Base-Wide Conclusions and Recommendations

The following conclusions and recommendations resulted from the Five Year Review of the NSGL sites included in this report.

### 8.1 Issues, Recommendations and Follow-up Actions

The recommendations and follow-up actions identified in the Five-Year Review process for Sites 22, 3, 2, 1, 4, and 19 are summarized in the table below.

Issue	Recommendations and Follow-up Actions	Party Responsible	Milestone Date
<b>Site 22, Former Building 105</b>			
Monitoring wells from the investigation and ERH Treatability Study are still in place	Properly abandon all wells on the site	NAVFAC	30 Dec 2016
<b>Site 3, Supplside Landfill</b>			
Bare area on landfill cover	Seed and mulch the area to prevent topsoil erosion	NAVFAC	30 Dec 2016
Two gas vents not spinning	Check and ensure gas vents are functioning properly	NAVFAC	30 Dec 2016
30 ft by 20 ft subsidence area observed	Investigate and repair subsidence area, if necessary	NAVFAC	30 Dec 2016
<b>Site 2, Forrestal Landfill</b>			
Bare areas on landfill cover	Seed and mulch the area to prevent topsoil erosion	NAVFAC	30 Dec 2016
Gas vent not spinning	Check and ensure gas vent is functioning properly	NAVFAC	30 Dec 2016
<b>Site 1, Golf Course Landfill</b>			
Update O&M Plan Roles and Responsibilities	* Assign riprap and abandoned storm sewer inspections to NAVSTA Great Lakes Project Manager as part of annual site inspection. * Remove requirement that golf course personnel prepare reports for submission to NS Great Lakes	NAVFAC	30 Dec 2016

Issue	Recommendations and Follow-up Actions	Party Responsible	Milestone Date
<b>Site 4 – Fire Fighting Training Unit</b>			
Update O&M Plan Roles and Responsibilities	*Assign riprap and abandoned storm sewer inspections to NAVSTA Great Lakes Project Manager as part of annual site inspection. *Remove requirement that golf course personnel prepare reports for submission to NS Great Lakes	NAVFAC	30 Dec 2016
<b>Site 19, Small Arms Range 910</b>			
Monitoring wells from the investigation are still in place	Properly abandon all wells on the site	NAVFAC	30 Dec 2016

## 8.2 Protectiveness Statement

Based on the information provided in this Five Year Review Report, the remedies selected for the following Naval Station Great Lakes sites at Great Lakes, Illinois, remain protective of human health and the environment:

- Site 22 – Former Building 105, Old Dry Cleaning Facility
- Site 3 – Supplyside Landfill
- Site 2 – Forrestal Landfill
- Site 1 – Golf Course Landfill
- Site 4 – Former Fire Fighting Training Unit
- Site 19 - Small Arms Range 910

## 8.3 Next Review

The CERCLA requirement is for reviews to be completed within each five-year period after initiation of the remedial action. The Navy elected to conduct the five year review in accordance with CERCLA. The first decision document for a site at NSGL was signed in 2008. This first five year review includes the monitoring program activities conducted at NSGL through 2015. The second five year review will be required to be completed by 2019.

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Site 19 – Small Arms Range 910

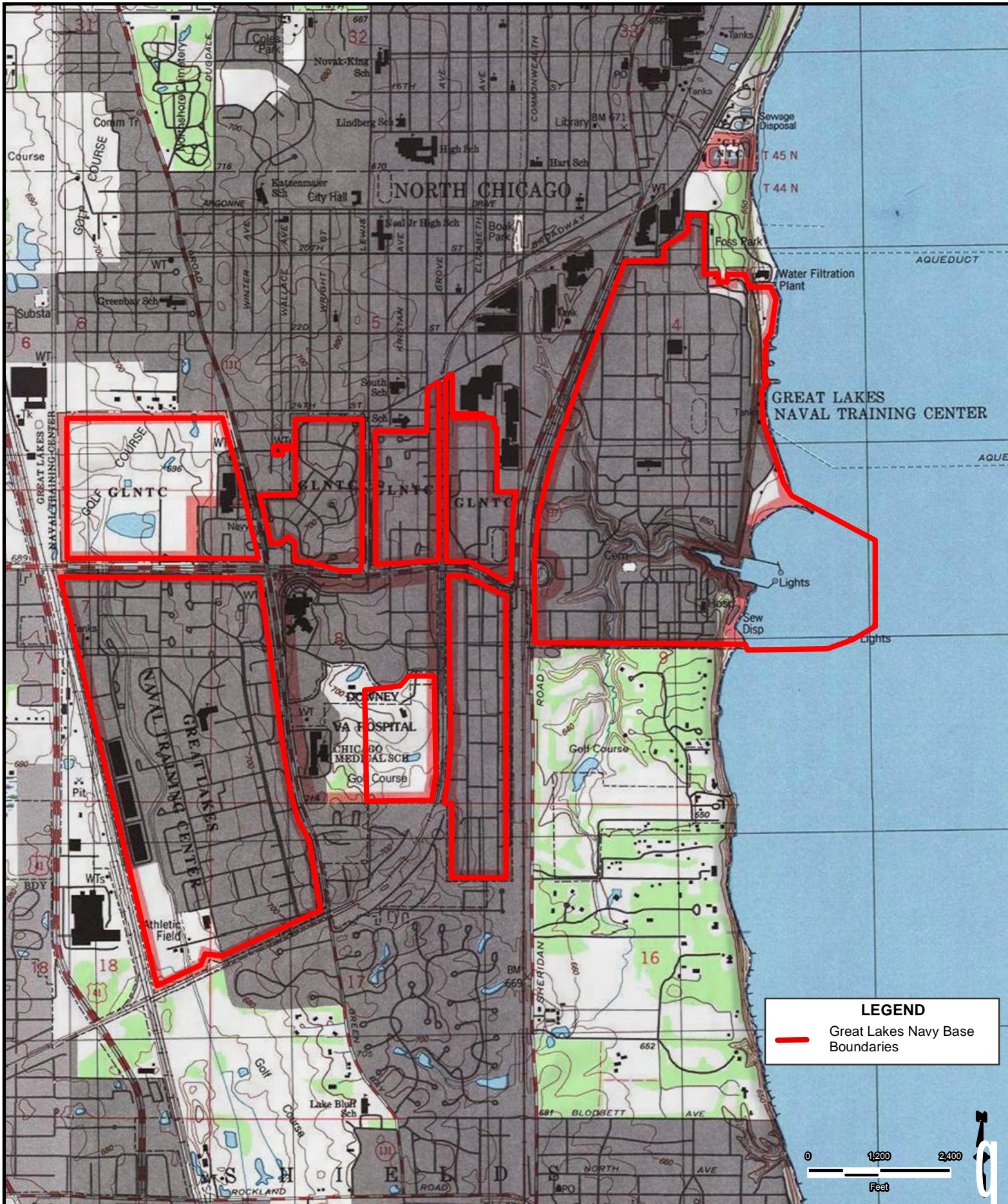
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## Figures



Prepared by:



Prepared for:



Source: USA Topo Maps from ESRI

## NAVAL STATION GREAT LAKES SITE LOCATION MAP

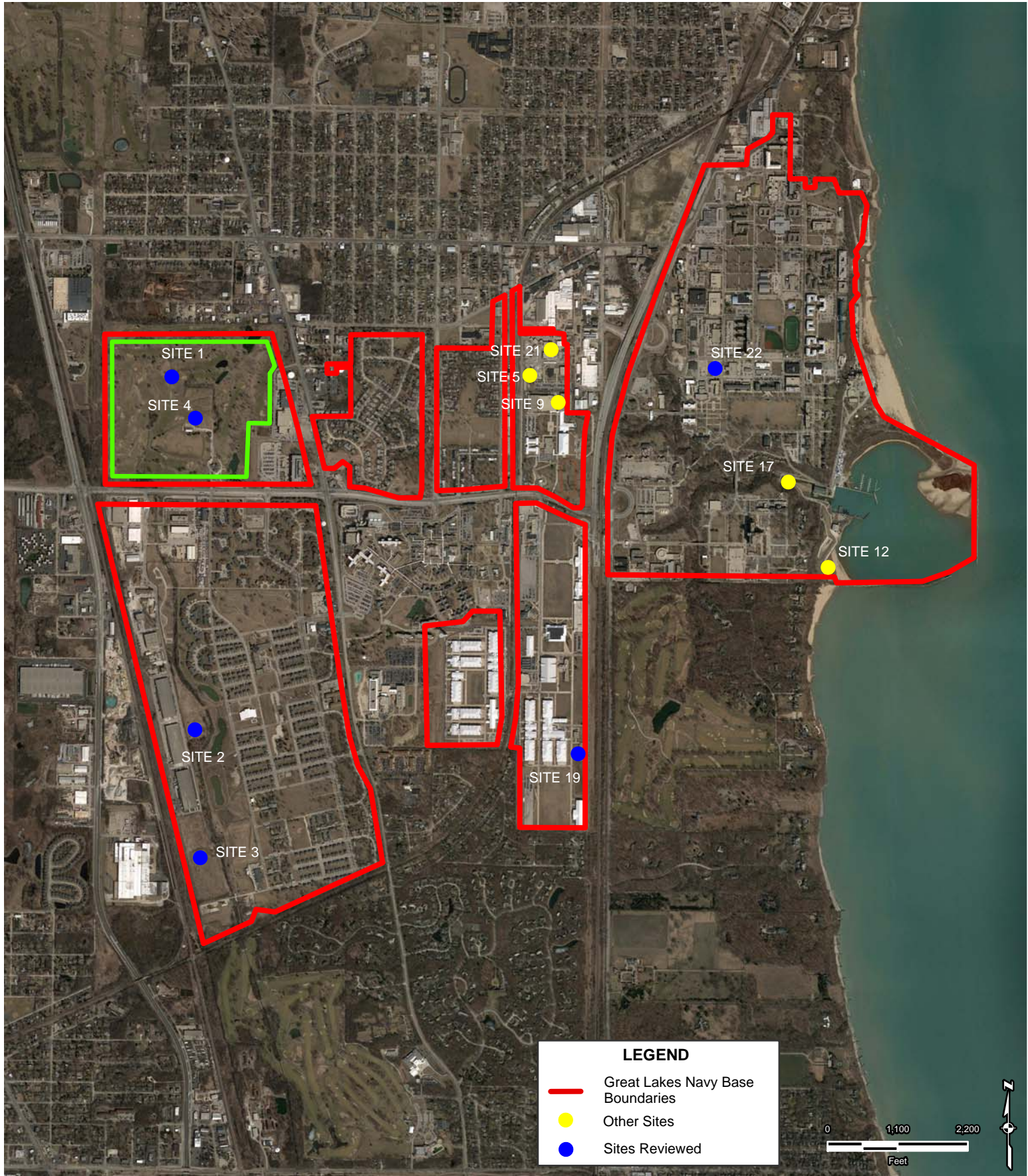
Drawn: SAE 1/27/2014

Approved:

Scale: AS SHOWN

PROJECT  
NUMBER 60274656

FIGURE  
NUMBER 1-1



Prepared by:



Prepared for:



## NAVAL STATION GREAT LAKES IRP SITE LOCATIONS

Drawn: ANS 3/22/2016

Approved:

Scale: AS SHOWN

PROJECT  
NUMBER 60274656

FIGURE  
NUMBER **1-2**



Prepared by:



Prepared for:



## NAVAL STATION GREAT LAKES SITE 22

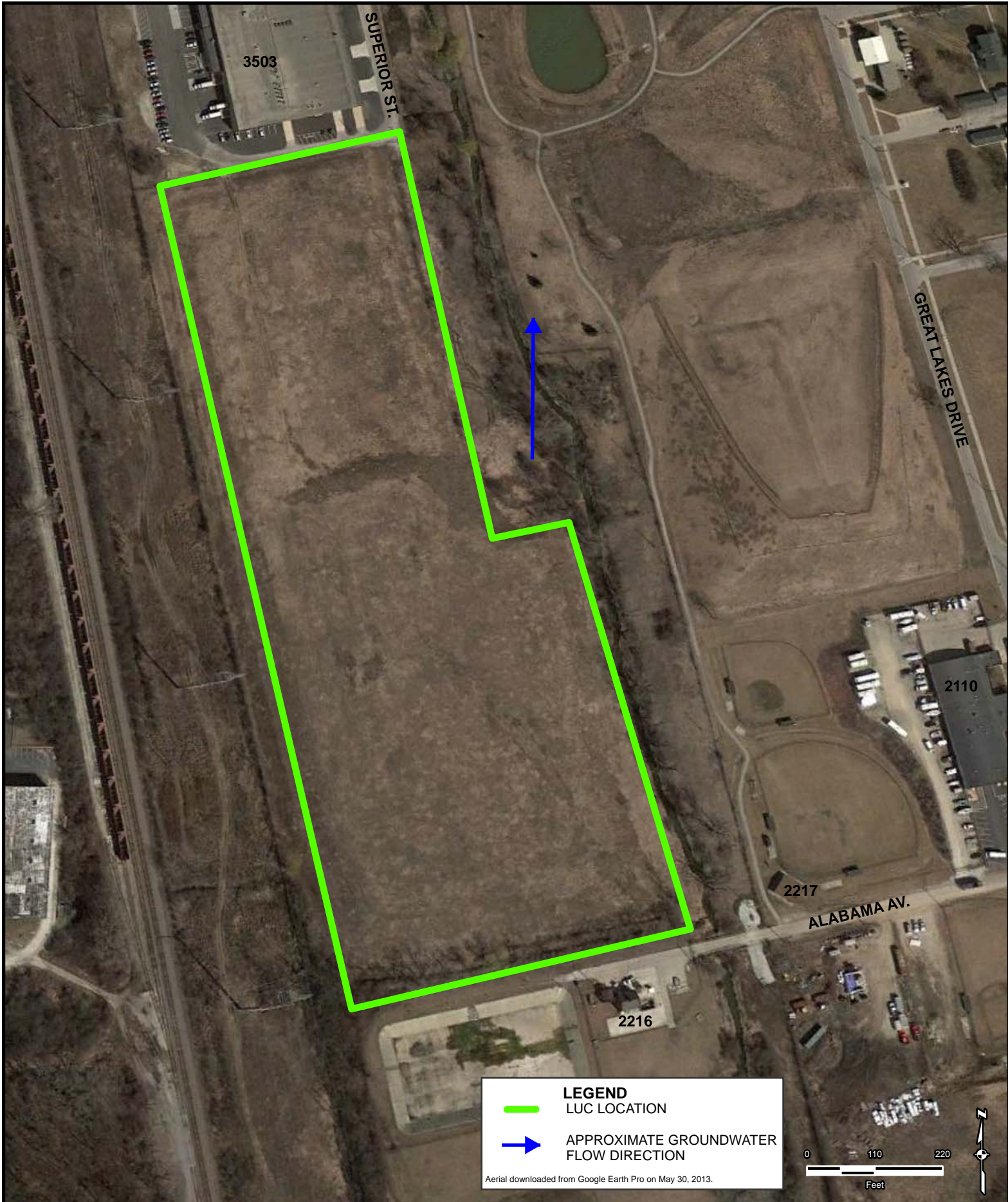
Drawn: ANS 3/22/2016

Approved:

Scale: AS SHOWN

PROJECT  
NUMBER 60274656

FIGURE  
NUMBER **2-1**



Prepared by:



**RESOLUTION  
CONSULTANTS**

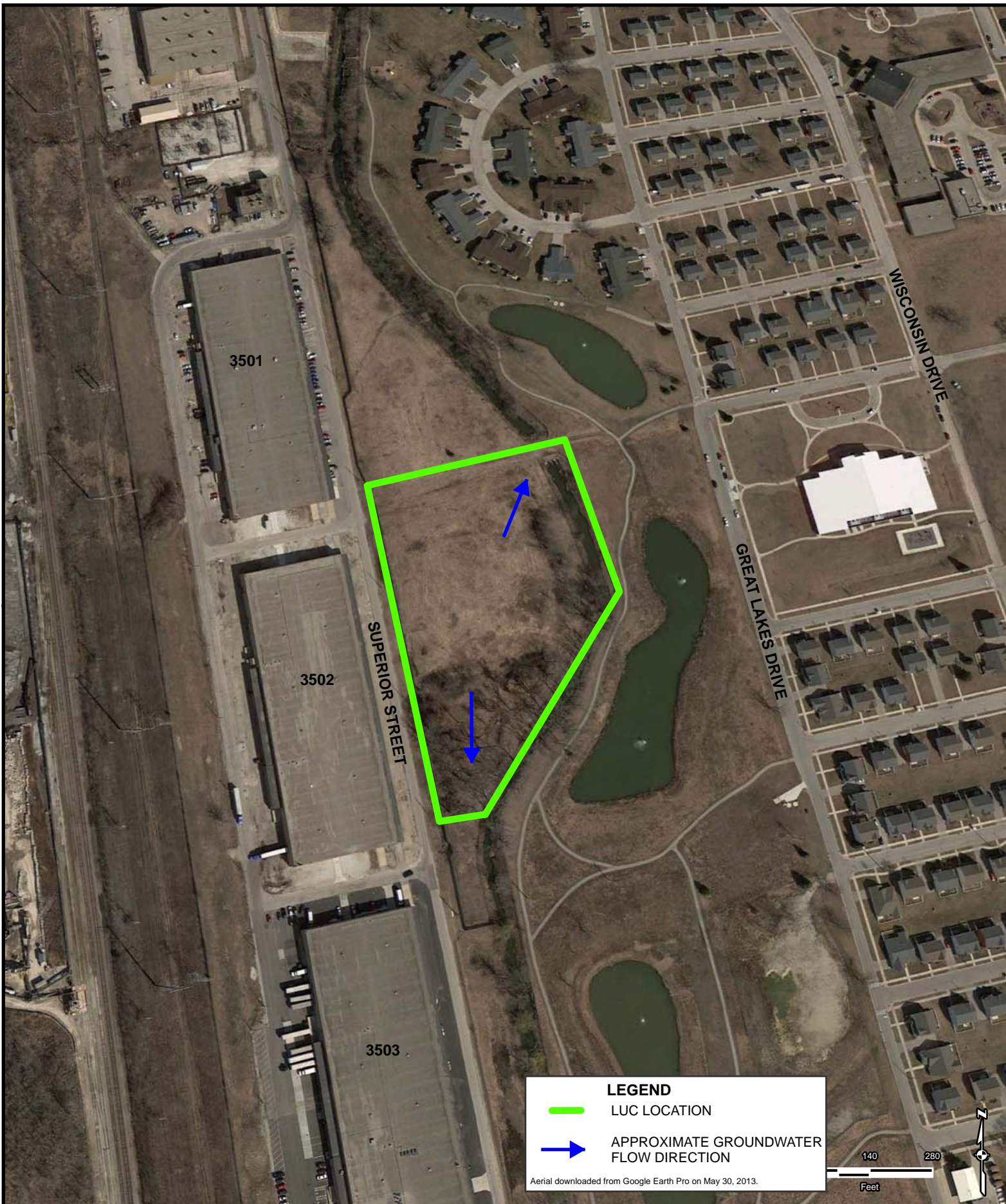
Prepared for:



**NAVFAC**  
Naval Facilities Engineering Command

**NAVAL STATION GREAT LAKES  
SITE 3**

Drawn:	SAE 3/22/2016
Approved:	
Scale:	AS SHOWN
PROJECT NUMBER	60274656
FIGURE NUMBER	<b>3-1</b>



Prepared by:



Prepared for:



## NAVAL STATION GREAT LAKES SITE 2

Drawn: SAE 3/22/2016

Approved:

Scale: AS SHOWN

PROJECT  
NUMBER 60274656

FIGURE  
NUMBER **4-1**



Prepared by:



Prepared for:



## NAVAL STATION GREAT LAKES SITE 1 - GOLF COURSE LANDFILL

Drawn: SAE 8/23/2013

Approved:

Scale: AS SHOWN

PROJECT  
NUMBER 60274656

FIGURE  
NUMBER **5-1**



Prepared by:



Prepared for:



# **NAVAL STATION GREAT LAKES SITE 4 - FIRE FIGHTER TRAINING UNIT**

Drawn: SAE 8/23/2013

Approved:

Scale: AS SHOWN

PROJECT  
NUMBER 60274656

FIGURE  
NUMBER **6-1**



Prepared by:



Prepared for:



**NAVAL STATION GREAT LAKES  
SITE 19 - SMALL ARMS RANGE 910**

Drawn: ANS 3/22/2016

Approved:

Scale: AS SHOWN

Project Number: 60274656

Figure Number: 7-1

**Appendix A**

**Recent Groundwater Laboratory Analytical Results**

**Appendix B - Table 1**  
**Summary of Detections and Criteria for Long Term Groundwater Monitoring Results from May 2014 (Round 17)**  
**Site 2 - Forrestal Landfill Naval Station Great Lakes, Illinois**

Analyte	Units	Criteria		Round 17 FL-01 5/20/2014 FL-01-20140520 N	Round 17 FL-02 5/21/2014 FL-02-20140521 N	Round 17 FL-03 5/20/2014 FL-03-20140520 N	Round 17 FL-04 5/20/2014 FL-04-20140520 N	Round 17 FL-04 5/20/2014 DUP-20140520 FD	Round 17 FL-05 5/21/2014 FL-05-20140521 N	Round 17 FL-06 5/20/2014 FL-06-20140520 N
		Screening Value	Source							
Volatile Organic Compounds:										
CIS-1,2-DICHLOROETHENE	µg/L	70	TACO/620	0.5 U	0.5 U	0.604 J	1 U	1 U	0.5 U	0.5 U
Semivolatile Organic Compounds:										
NAPHTHALENE	µg/L	140	TACO/620	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.0653 J	0.0943 U
Dissolved Metals:										
ALUMINUM	µg/L	3500	Non-TACO	54.6 J	599	49.6 J	124 J	123 J	59.7	25 U
ANTIMONY	µg/L	6	TACO/620	1.36 J	2 U	2 U	1.73 J	1.87 J	2 U	2 U
ARSENIC	µg/L	10	620	1.5 U	2.77	53.8	1.5 U	1.5 U	5.16	1.5 U
BARIUM	µg/L	2000	TACO/620	21.4	42.3	308	1390	1360	48.3	67.4
CALCIUM	µg/L	--	--	146000	32200	166000	215000	212000	86400	120000
CHROMIUM, TOTAL	µg/L	100	TACO/620	2 UJ	0.85 J	1 U	5 UJ	5 UJ	1 U	1 U
COBALT	µg/L	1000	TACO/620	2.5 U	2.5 U	2.86 J	8.66	8.54	1.91 J	2.5 U
COPPER	µg/L	650	TACO/620	2 UJ	1.41 J	2 UJ	2 UJ	2 UJ	1.62 J	1.33 J
IRON	µg/L	5000	TACO/620	15 U	692	15800	11700	11600	2320	15 U
LEAD	µg/L	7.5	TACO/620	0.882 J	0.437 J	1 J	1.12 J	1.29 J	0.528 J	0.748 J
MAGNESIUM	µg/L	--	--	179000	26600	84600	159000	157000	50100	68400
MANGANESE	µg/L	150	TACO/620	1.5 U	15.3	120	121	115	107	11.5
NICKEL	µg/L	100	TACO/620	1.11 J	1.21 J	14.9 J	17.2 J	16.6 J	2.49 J	0.879 J
POTASSIUM	µg/L	--	--	4140	1740	2250	33900	33200	1530	1700
SODIUM	µg/L	--	--	56700	59700	71000	362000	359000	41400	27600
VANADIUM	µg/L	49	TACO/620	2.5 U	1.3 J	2.5 U	2.6 J	2.53 J	2.5 U	2.5 U
ZINC	µg/L	5000	TACO/620	5 UJ	1.77 J	4.54 J	12.5 UJ	12.5 UJ	3.89 J	2.5 UJ
Miscellaneous Parameters:										
AMMONIA	mg/L as N	30	SMCL	0.15 U	0.293 J	0.185 J	27.1 J	13.8 J	0.59	0.15 U
CHLORIDE	mg/L	200	TACO/620	52.3	59.8	113	484	493	25.8	42.2
NITRATE	mg/L as N	10	TACO/620	0.117 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.079 J
SULFATE	mg/L	400	TACO/620	626	139	26.2	51.9	52	185	188
TOTAL DISSOLVED SOLIDS	mg/L	500	SMCL	1420	459	921	2050	2070	555	691
TOTAL SUSPENDED SOLIDS	mg/L	--	--	10 U	68	28	23	20	10 U	10 U
Field Parameters:										
DISSOLVED OXYGEN	mg/L	--	--	2.15	0.19	0.16	1.48	NA	0.53	1.53
OXIDATION REDUCTION POTENTIAL	mV	--	--	105.9	-5.2	-30.4	-75.3	NA	-188.2	95.8
PH	SU	6.5-8.5	SMCL	6.89	8.26	6.55	6.67	NA	7.6	7.12
SPECIFIC CONDUCTANCE	mS/cm	--	--	1.942	0.654	1.66	3.652	NA	0.938	1.118
TEMPERATURE	°C	--	--	12.93	13.6	13.5	12.5	NA	14.2	14.7
TURBIDITY	NTU	--	--	0.5	73.2	3.89	1.9	NA	1.53	4.3

**Notes:**

U - nondetect

J - estimated value

UJ - estimated limit of detection (LOD)

Results exceeding screening are highlighted and in bold.

TACO = Illinois EPA Tiered Approach to Corrective Action Objectives, taken from Illinois Administrative Code 35, Chapter I, Section 742, Appendix B, Table E (IEPA 2007).

RSLs = USEPA Regions 3, 6, and 9 Regional Screen Level, (May 2014).

620 = Illinois EPA Class I Potable Resource Groundwater, taken from Illinois Administrative Code 35, Chapter I, Section 620, Subpart D (IEPA 2012).

If two sources of criteria are listed, the values are the same for the sources listed.

RSL-Tap: Regional Screening Level, Tapwater

TACO: Tiered Approach to Corrective Action Objectives, Soil Component of Groundwater Ingestion Exposure Route Class I

SMCL: USEPA Secondary Maximum Containment Level

Non-TACO: GRO not promulgated Under 35 IAC 742

**Appendix B - Table 2**  
**Groundwater Results from May 2014 (Round 17) Long Term Monitoring**  
**Site 2 - Forrestal Landfill Naval Station Great Lakes, Illinois**

Analyte	Units	Criteria		Round 17 FL-01 5/20/2014 FL-01-20140520 N	Round 17 FL-02 5/21/2014 FL-02-20140521 N	Round 17 FL-03 5/20/2014 FL-03-20140520 N	Round 17 FL-04 5/20/2014 FL-04-20140520 N	Round 17 FL-04 5/20/2014 DUP-20140520 FD	Round 17 FL-05 5/21/2014 FL-05-20140521 N	Round 17 FL-06 5/20/2014 FL-06-20140520 N
		Screening Value	Source							
Volatile Organic Compounds:										
BENZENE	µg/L	5	TACO/620	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	µg/L	70	TACO/620	0.5 U	0.5 U	0.604 J	1 U	1 U	0.5 U	0.5 U
TETRAHYDROFURAN	µg/L	340	RSL-Tap	2.5 U	2.5 U	2.5 U	5 U	5 U	2.5 U	2.5 U
TOLUENE	µg/L	1000	TACO/620	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U
VINYL CHLORIDE	µg/L	2	TACO/620	0.25 U	0.25 U	0.25 U	0.5 U	0.5 U	0.25 U	0.25 U
Semivolatile Organic Compounds:										
ACENAPHTHENE	µg/L	420	TACO/620	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.098 U	0.0943 U
ACENAPHTHYLENE	µg/L	210	Non-TACO	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.098 U	0.0943 U
ANTHRACENE	µg/L	2100	TACO/620	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.098 U	0.0943 U
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.05 U	0.05 U	0.0476 U	0.0481 U	0.0476 U	0.049 U	0.0472 U
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.05 U	0.05 U	0.0476 U	0.0481 U	0.0476 U	0.049 U	0.0472 U
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.05 U	0.05 U	0.0476 U	0.0481 U	0.0476 U	0.049 U	0.0472 U
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.098 U	0.0943 U
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.05 U	0.05 U	0.0476 U	0.0481 U	0.0476 U	0.049 U	0.0472 U
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	0.779 U	0.719 UJ	0.741 U	0.69 U	0.634 U	0.719 UJ	0.659 U
CHRYSENE	µg/L	1.5	TACO	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.098 U	0.0943 U
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.098 U	0.0943 U
FLUORANTHENE	µg/L	280	TACO/620	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.098 U	0.0943 U
FLUORENE	µg/L	280	TACO/620	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.098 U	0.0943 U
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.098 U	0.0943 U
NAPHTHALENE	µg/L	140	TACO/620	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.0653 J	0.0943 U
PHENANTHRENE	µg/L	210	Non-TACO	0.2 U	0.2 U	0.19 U	0.192 U	0.19 U	0.196 U	0.189 U
PYRENE	µg/L	210	TACO/620	0.1 U	0.1 U	0.0952 U	0.0962 U	0.0952 U	0.098 U	0.0943 U
Dissolved Metals:										
ALUMINUM	µg/L	3500	Non-TACO	54.6 J	599	49.6 J	124 J	123 J	59.7	25 U
ANTIMONY	µg/L	6	TACO/620	1.36 J	2 U	2 U	1.73 J	1.87 J	2 U	2 U
ARSENIC	µg/L	10	620	1.5 U	2.77	53.8	1.5 U	1.5 U	5.16	1.5 U
BARIUM	µg/L	2000	TACO/620	21.4	42.3	308	1390	1360	48.3	67.4
BERYLLIUM	µg/L	4	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CADMIUM	µg/L	5	TACO/620	1 U	0.5 U	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
CALCIUM	µg/L	--	--	146000	32200	166000	215000	212000	86400	120000
CHROMIUM, TOTAL	µg/L	100	TACO/620	2 UJ	0.85 J	1 U	5 UJ	5 UJ	1 U	1 U
COBALT	µg/L	1000	TACO/620	2.5 U	2.5 U	2.86 J	8.66	8.54	1.91 J	2.5 U
COPPER	µg/L	650	TACO/620	2 UJ	1.41 J	2 UJ	2 UJ	2 UJ	1.62 J	1.33 J
IRON	µg/L	5000	TACO/620	15 U	692	15800	11700	11600	2320	15 U
LEAD	µg/L	7.5	TACO/620	0.882 J	0.437 J	1 J	1.12 J	1.29 J	0.528 J	0.748 J
MAGNESIUM	µg/L	--	--	179000	26600	84600	159000	157000	50100	68400
MANGANESE	µg/L	150	TACO/620	1.5 U	15.3	120	121	115	107	11.5
MERCURY	µg/L	2	TACO/620	0.16 UJ	0.16 U	0.16 UJ	0.16 UJ	0.16 UJ	0.16 U	0.16 UJ
NICKEL	µg/L	100	TACO/620	1.11 J	1.21 J	14.9 J	17.2 J	16.6 J	2.49 J	0.879 J
POTASSIUM	µg/L	--	--	4140	1740	2250	33900	33200	1530	1700
SELENIUM	µg/L	50	TACO/620	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U
SILVER	µg/L	50	TACO/620	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
SODIUM	µg/L	--	--	56700	59700	71000	362000	359000	41400	27600
THALLIUM	µg/L	2	TACO/620	1 U	1 U	1 U	1 U	1 U	1 U	1 U
VANADIUM	µg/L	49	TACO/620	2.5 U	1.3 J	2.5 U	2.6 J	2.53 J	2.5 U	2.5 U
ZINC	µg/L	5000	TACO/620	5 UJ	1.77 J	4.54 J	12.5 UJ	12.5 UJ	3.89 J	2.5 UJ

**Appendix B - Table 2**  
**Groundwater Results from May 2014 (Round 17) Long Term Monitoring**  
**Site 2 - Forrestal Landfill Naval Station Great Lakes, Illinois**

Analyte	Units	Criteria		Round 17 FL-01 5/20/2014 FL-01-20140520 N	Round 17 FL-02 5/21/2014 FL-02-20140521 N	Round 17 FL-03 5/20/2014 FL-03-20140520 N	Round 17 FL-04 5/20/2014 FL-04-20140520 N	Round 17 FL-04 5/20/2014 DUP-20140520 FD	Round 17 FL-05 5/21/2014 FL-05-20140521 N	Round 17 FL-06 5/20/2014 FL-06-20140520 N
		Screening Value	Source							
Miscellaneous Parameters:										
AMMONIA	mg/L as N	30	SMCL	0.15 U	0.293 J	0.185 J	27.1 J	13.8 J	0.59	0.15 U
CHLORIDE	mg/L	200	TACO/620	52.3	59.8	113	484	493	25.8	42.2
NITRATE	mg/L as N	10	TACO/620	0.117 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.079 J
SULFATE	mg/L	400	TACO/620	626	139	26.2	51.9	52	185	188
TOTAL DISSOLVED SOLIDS	mg/L	500	SMCL	1420	459	921	2050	2070	555	691
TOTAL SUSPENDED SOLIDS	mg/L	--	--	10 U	68	28	23	20	10 U	10 U
Field Parameters:										
DISSOLVED OXYGEN	mg/L	--	--	2.15	0.19	0.16	1.48	NA	0.53	1.53
OXIDATION REDUCTION POTENTIAL	mV	--	--	105.9	-5.2	-30.4	-75.3	NA	-188.2	95.8
PH	SU	6.5-8.5	SMCL	6.89	8.26	6.55	6.67	NA	7.6	7.12
SPECIFIC CONDUCTANCE	mS/cm	--	--	1.942	0.654	1.66	3.652	NA	0.938	1.118
TEMPERATURE	°C	--	--	12.93	13.6	13.5	12.5	NA	14.2	14.7
TURBIDITY	NTU	--	--	0.5	73.2	3.89	1.9	NA	1.53	4.3

**Notes:**

U - nondetect

J - estimated value

UJ - estimated limit of detection (LOD)

Results exceeding screening are highlighted and in bold.

TACO = Illinois EPA Tiered Approach to Corrective Action Objectives, taken from Illinois Administrative Code 35, Chapter I, Section 742, Appendix B, Table E (IEPA 2007).

RLs = USEPA Regions 3, 6, and 9 Regional Screening Level, (May 2014).

620 = Illinois EPA Class I Potable Resource Groundwater, taken from Illinois Administrative Code 35, Chapter I, Section 620, Subpart D (IEPA 2012).

If two sources of criteria are listed, the values are the same for the sources listed.

RSL-Tap: Regional Screening Level, Tapwater

TACO: Tiered Approach to Corrective Action Objectives, Soil Component of Groundwater Ingestion Exposure Route Class I

SMCL: USEPA Secondary Maximum Containment Level

Non-TACO: GRO not promulgated Under 35 IAC 742

Appendix B - Table 3  
Historical Groundwater Results for LTM  
Site 2 Forrestal Landfill Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10	Round 10	Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17
		Screening Value	Source	FL-01 8/16/2006 FL-01_20060816 N	FL-01 39093 FL-01_20070111 N	FL-01 4/19/2007 FL-01_20070419 N	FL-01 8/8/2007 FL-01_20070808 N	FL-01 11/13/2007 NTC02GW0105 N	FL-01 2/27/2008 NTC02GW0106 N	FL-01 5/7/2008 NTC02GW0107 N	FL-01 8/20/2008 NTC02GW0108 N	FL-01 11/18/2008 NTC02GW0109 N	FL-01 5/19/2009 NTC02GW0110 N	FL-01 5/19/2009 NTC02GW0110-D FD	FL-01 11/16/2009 NTC02GW0111 N	FL-01 5/6/2010 NTC02GW0112 N	FL-01 11/18/2010 NTC02GW0113 N	FL-01 5/19/2011 NTC02GW0114 N	FL-01 5/2/2012 NTC02GW0115 N	FL-01 5/13/2013 FL-01-20130513 N	FL-01 5/20/2014 FL-01-20140520 N
Volatile Organic Compounds:																					
BENZENE	µg/L	5	TACO/620	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	µg/L	70	TACO/620	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U
TETRAHYDROFURAN	µg/L	340	RSL-Tap	25 U	25 U	25 U	25 U	5 U	5 UR	5 UR	5 UJ	5 UR	5 U	5 U	5 UR	5 UR	5 UR	5 UR	1 UR	2.5 U	2.5 U
TOLUENE	µg/L	1000	TACO/620	0.861	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	µg/L	2	TACO/620	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.25 U	0.25 U
Semivolatile Organic Compounds:																					
ACENAPHTHENE	µg/L	420	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.088 J	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.05 U	0.098 U	0.1 U
ACENAPHTHYLENE	µg/L	210	Non-TACO	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.05 U	0.098 U	0.1 U
ANTHRACENE	µg/L	2100	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.05 U	0.098 U	0.1 U
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.049 U	0.05 U
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.049 U	0.05 U
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.049 U	0.05 U
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.098 U	0.1 U
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.049 U	0.05 U
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	2.5 U	13.9	15.7	3.15 J	0.49 J	0.5 U	0.5 U	0.5 U	0.5 U	1.4	0.5 U	0.55 U	0.53 U	0.8 U	0.5 U	0.5 U	0.196 U	0.779 U
CHRYSENE	µg/L	1.5	TACO	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.098 U	0.1 U
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.049 U	0.1 U
FLUORANTHENE	µg/L	280	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.05 U	0.098 U	0.1 U
FLUORENE	µg/L	280	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.11 J	0.098 U	0.1 U
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.032 J	0.098 U	0.1 U
NAPHTHALENE	µg/L	140	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.062 J	0.5 U	9.3	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.098 U	0.1 U	0.1 U
PHENANTHRENE	µg/L	210	Non-TACO	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.53 U	0.5 U	0.5 U	0.5 U	0.05 U	0.098 U	0.2 U
PYRENE	µg/L	210	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55 U	0.2 J	0.5 U	0.5 U	0.5 U	0.1 U	0.098 U	0.1 U
Dissolved Metals:																					
ALUMINUM	µg/L	3500	Non-TACO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13 U	NA	54.6 J
ANTIMONY	µg/L	6	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	NA	1.36 J
ARSENIC	µg/L	10	620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.26 J	NA	1.5 U
BARIUM	µg/L	2000	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21	NA	21.4
BERYLLIUM	µg/L	4	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	0.5 U
CADMIUM	µg/L	5	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.038 U	NA	1 U
CALCIUM	µg/L	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	140000	NA	146000
CHROMIUM, TOTAL	µg/L	100	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA	2 UJ
COBALT	µg/L	1000	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U	NA	2.5 U
COPPER	µg/L	650	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.47 J	NA	2 UJ
IRON	µg/L	5000	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.5 U	NA	15 U
LEAD	µg/L	7.5	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	NA	0.882 J
MAGNESIUM	µg/L	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	160000	NA	179000
MANGANESE	µg/L	150	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.76 J	NA	1.5 U
MERCURY	µg/L	2	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.055 U	NA	0.16 UJ
NICKEL	µg/L	100	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.5	NA	1.11 J
POTASSIUM	µg/L	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3600	NA	4140
SELENIUM	µg/L	50	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.31 U	NA	1.25 U
SILVER	µg/L	50	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.037 U	NA	0.5 UJ
SODIUM	µg/L	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	60000	NA	56700
THALLIUM	µg/L	2	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.037 J	NA	1 U
VANADIUM	µg/L	49	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.17 J	NA	2.5 U
ZINC	µg/L	5000	TACO/620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.4 U	NA	5 UJ
Miscellaneous Parameters:																					
AMMONIA	mg/L as N	30	SMCL	0.157	0.434	0.186	0.241	0.14	0.049	0.05 U	0.056	0.036	0.0097 UJ	0.05 UJ	0.033 J	0.05 U	0.11	0.038 J	0.01 J	0.15 U	0.15 U
CHLORIDE	mg/L	200	TACO/620	22.4	29.6	33.4	38.6	26	36	47	50 J	40	55	55	50	51	42	51	46.4	52.3	52.3
NITRATE	mg/L as N	10	TACO/620	NA	NA	NA	NA	0.082	0.27	0.28	0.13	0.15	0.19	0.21	0.18	0.2	0.058 U	0.17	0.18	NA	0.117 J
SULFATE	mg/L	400	TACO/620	327	406	526	511	420 J	470	580	590 J	540	650	560	580	620	590	590	630	578	626
TOTAL DISSOLVED SOLIDS	mg/L	500	SMCL	958	958	1240	1200	1100	1200	1400	1400	1200	1400	1500	1400 J	1400	1300	1360	1480	1410	1420
TOTAL SUSPENDED SOLIDS	mg/L	--	--	2.5 U	5.5	3	2.5 U	3.3 UJ	3.3 U	3.3 U	3.3 U	3.7	3.3 U	3.3 U	11	4.9	3.9	3.3 U	4.7	18.0	10 U
Field Parameters:																					
DISSOLVED OXYGEN	mg/L	--	--	NA	NA	NA	NA	0.78	0.87	0.57	0.24	0.24	0.9	NA	0.22	3.47	NA	NA	NA	2.27	2.15
OXIDATION REDUCTION POTENTIAL	mV	--	--	NA	NA	NA	NA	68	83	198	82	49	84	NA	86	69	NA	NA	NA	177	105.9
PH	SU	6.5-8.5	SMCL	NA	NA	NA	NA	6.89	6.93	6.95	7.03										

Appendix B - Table 3  
Historical Groundwater Results for LTM  
Site 2 Forrestal Landfill Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10	Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 1	Round 2	Round 2	Round 3
		Screening Value	Source	FL-02 8/30/2006 FL-02_20060830 N	FL-02 39111 FL-02_20070129 N	FL-02 4/18/2007 FL-02_20070418 N	FL-02 8/15/2007 FL-02_20070815 N	FL-02 11/14/2007 NTC02GW0205 N	FL-02 2/26/2008 NTC02GW0206 N	FL-02 5/8/2008 NTC02GW0207 N	FL-02 8/20/2008 NTC02GW0208 N	FL-02 11/20/2008 NTC02GW0209 N	FL-02 5/19/2009 NTC02GW0210 N	FL-02 11/18/2009 NTC02GW0211 N	FL-02 5/5/2010 NTC02GW0212 N	FL-02 11/17/2010 NTC02GW0213 N	FL-02 5/18/2011 NTC02GW0214 N	FL-02 5/2/2012 NTC02GW0215 N	FL-02 5/15/2013 FL-02-20130515 N	FL-02 5/21/2014 FL-02-20140521 N	FL-03 8/31/2006 FL-03_20060831 N	FL-03 39100 FL-03_20070118-D FD	FL-03 39100 FL-03_20070118-D FD	FL-03 4/24/2007 FL-03_20070424 N
				Volatile Organic Compounds:																				
BENZENE	µg/L	5	TACO/620	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U	0.5 U	0.5 U	0.125 U	0.125 U	0.176 J	0.138
CIS-1,2-DICHLOROETHENE	µg/L	70	TACO/620	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.372	0.514	0.574 J	0.569
TETRAHYDROFURAN	µg/L	340	RSL-Tap	25 U	25 U	25 U	25 U	5 U	5 UR	5 UR	5 UJ	5 UR	5 U	5 UR	5 UR	5 UR	5 UR	1 UR	2.5 U	2.5 U	25 U	25 U	25 U	25 U
TOLUENE	µg/L	1000	TACO/620	0.34	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.413	0.25 U	0.25 U	0.25 U
VINYL CHLORIDE	µg/L	2	TACO/620	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Semivolatile Organic Compounds:																								
ACENAPHTHENE	µg/L	420	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.05 U	0.0943 U	0.1 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
ACENAPHTHYLENE	µg/L	210	Non-TACO	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.05 U	0.0943 U	0.1 U	NA	NA	NA	NA
ANTHRACENE	µg/L	2100	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.021 J	0.0943 U	0.1 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.032 J	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.12 U	0.0472 U	0.05 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.062 J	0.0472 U	0.05 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.23 J	0.0472 U	0.05 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.22 J	0.0943 U	0.1 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.21 J	0.0472 U	0.05 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	2.5 U	2.5 U	2.5 U	2.5 U	0.44 J	0.5 U	0.91	0.5 U	0.54 U	0.5 U	0.5 U	0.89 U	0.54	0.53 U	1	0.189 U	0.719 UJ	2.86	2.5 U	2.86 U	2.5 U
CHRYSENE	µg/L	1.5	TACO	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.2 U	0.0943 U	0.1 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.16 J	0.0472 U	0.1 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
FLUORANTHENE	µg/L	280	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.046 J	0.5 U	0.5 U	0.022 J	0.5 U	0.12 J	0.5 U	0.053 J	0.53 U	0.1 J	0.0943 U	0.1 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
FLUORENE	µg/L	280	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.05 U	0.0943 U	0.1 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.2 J	0.0943 U	0.1 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
NAPHTHALENE	µg/L	140	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.5 U	0.5 U	0.011 J	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.05 U	0.0943 U	0.1 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
PHENANTHRENE	µg/L	210	Non-TACO	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.038 J	0.14 J	0.17 J	0.065 J	0.052 J	0.13 J	0.062 J	0.11 J	0.53 U	0.094 J	0.094 J	0.0943 U	0.2 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
PYRENE	µg/L	210	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0549 U	0.5 U	0.5 U	0.049 J	0.5 U	0.032 J	0.5 U	0.45 J	0.5 U	0.5 U	0.53 U	0.12 J	0.0943 U	0.1 U	0.0526 U	0.0526 U	0.0562 U	0.0526 U
Dissolved Metals:																								
ALUMINUM	µg/L	3500	Non-TACO	NA	NA	NA	NA	44 U	52	100 U	100 U	100 U	100	870	23 U	2500	100 U	13 U	NA	599	NA	NA	NA	NA
ANTIMONY	µg/L	6	TACO/620	NA	NA	NA	NA	0.44 U	1 U	1 U	1 U	1 U	0.4 U	1 U	0.36 U	0.36 U	1 U	0.15 U	NA	2 U	NA	NA	NA	NA
ARSENIC	µg/L	10	620	NA	NA	NA	NA	3.1	2.7	2.9	2.9 J	2.8	2.3	2.5	3.2	2.1 J	2.9 J	3	NA	2.77	NA	NA	NA	NA
BARIUM	µg/L	2000	TACO/620	NA	NA	NA	NA	46	44	53	47	54	54	59	57	58	42	42	NA	42.3	NA	NA	NA	NA
BERYLLIUM	µg/L	4	TACO/620	NA	NA	NA	NA	0.31 U	1 U	1 U	1 U	1 U	0.31 U	1 U	0.3 U	0.3 U	1 U	0.11 U	NA	0.5 U	NA	NA	NA	NA
CADMIUM	µg/L	5	TACO/620	NA	NA	NA	NA	0.062 U	0.2 U	0.2 U	0.2 U	0.2 U	0.06 U	0.2 U	0.055 U	0.18 J	0.2 U	0.093 J	NA	0.5 U	NA	NA	NA	NA
CALCIUM	µg/L	--	--	NA	NA	NA	NA	29000 J	28000 J	33000	30000	36000 J	42000	36000	50000 J	49000	46000	40000	NA	32200	NA	NA	NA	NA
CHROMIUM, TOTAL	µg/L	100	TACO/620	NA	NA	NA	NA	2	1 UJ	1.2	1 U	1 U	0.78 U	1.9	0.66 U	4.8	0.21 J	0.2 U	NA	0.850 J	NA	NA	NA	NA
COBALT	µg/L	1000	TACO/620	NA	NA	NA	NA	0.096 U	1 U	0.17	1 UJ	0.19	0.28	0.65	0.12 J	1.3	1 U	0.069 J	NA	2.5 U	NA	NA	NA	NA
COPPER	µg/L	650	TACO/620	NA	NA	NA	NA	0.73	0.61	0.84	0.96 UJ	0.92	1	2.1	0.81 J	3	0.4 J	0.42 J	NA	1.41 J	NA	NA	NA	NA
IRON	µg/L	5000	TACO/620	NA	NA	NA	NA	8 U	64	20 U	12 J	24	250	950	4.3 J	2400	9.9 J	20	NA	692	NA	NA	NA	NA
LEAD	µg/L	7.5	TACO/620	NA	NA	NA	NA	0.33 U	1 U	1 U	1 U	1 U	0.26 U	0.56	0.22 U	1.1	1 U	0.15 U	NA	0.437 J	NA	NA	NA	NA
MAGNESIUM	µg/L	--	--	NA	NA	NA	NA	19000 J	20000 J	24000	22000	27000 J	32000	29000	37000 J	38000	35000	30000	NA	26600	NA	NA	NA	NA
MANGANESE	µg/L	150	TACO/620	NA	NA	NA	NA	9.1	8.4	7.5	5.8	6.9	8.5	22	5.2	36	3.1	3.2	NA	15.3	NA	NA	NA	NA
MERCURY	µg/L	2	TACO/620	NA	NA	NA	NA	0.046 U	0.2 U	0.2 U	0.2 U	0.2 U	0.043 U	0.2 U	0.061 U	0.061 U	0.2 U	0.055 U	NA	0.16 U	NA	NA	NA	NA
NICKEL	µg/L	100	TACO/620	NA	NA	NA	NA	0.9	0.9	1.4	1	1.7	11	3.3	2.1	4.7	1 U	0.5 J	NA	1.21 J	NA	NA	NA	NA
POTASSIUM	µg/L	--	--	NA	NA	NA	NA	1300	1200	1300	1300	1400	1600	1800	1600	2700	1500	1500	NA	1740	NA	NA	NA	NA
SELENIUM	µg/L	50	TACO/620	NA	NA	NA	NA	0.92 U	1 U	0.62														

Appendix B - Table 3  
Historical Groundwater Results for LTM  
Site 2 Forrestal Landfill Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 3	Round 4	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10	Round 11	Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 1	Round 1	Round 2	Round 3
		Screening Value	Source	FL-03 4/24/2007 FL-03_20070424-D FD	FL-03 8/13/2007 FL-03_20070813 N	FL-03 8/13/2007 FL-03_20070813-D FD	FL-03 11/14/2007 NTC02GW0305 N	FL-03 2/27/2008 NTC02GW0306 N	FL-03 5/8/2008 NTC02GW0307 N	FL-03 8/20/2008 NTC02GW0308 N	FL-03 11/20/2008 NTC02GW0309 N	FL-03 5/19/2009 NTC02GW0310 N	FL-03 11/17/2009 NTC02GW0311 N	FL-03 11/17/2009 NTC02GW0311-D FD	FL-03 5/5/2010 NTC02GW0312 N	FL-03 11/17/2010 NTC02GW0313 N	FL-03 5/18/2011 NTC02GW0314 N	FL-03 5/2/2012 NTC02GW0315 N	FL-03 5/15/2013 FL-03-20130515 N	FL-03 5/20/2014 FL-03-20140520 N	FL-04 8/22/2006 FL-04_20060822 N	FL-04 8/22/2006 FL-04_20060822-D FD	FL-04 39112 FL-04_20070130 N	FL-04 4/30/2007 FL-04_20070430 N
Volatile Organic Compounds:																								
BENZENE	µg/L	5	TACO/620	0.125 U	0.19 J	0.125 U	0.17 J	1 U	0.18 J	0.18 J	0.22 J	0.19 J	0.19 J	0.21 J	1 U	0.19 J	0.21 J	0.24 J	0.5 U	0.5 U	0.765	0.641 J	0.702	0.822
CIS-1,2-DICHLOROETHENE	µg/L	70	TACO/620	0.632 J	0.631 J	0.77 J	0.73 J	0.74 J	0.77 J	0.73 J	0.8 J	0.72 J	0.77 J	0.79 J	0.75 J	0.72 J	0.66 J	0.67 J	0.570 J	0.604 J	0.25 U	0.25 U	0.25 U	0.25 U
TETRAHYDROFURAN	µg/L	340	RSL-Tap	25 U	25 U	25 U	5 U	5 UR	4 J	3.8 J	5 UR	5.2	6.2 J	6.4 J	5.6 J	5 UR	5 UR	6.1 J	4.05 J	2.5 U	25 U	25 U	25 U	25 U
TOLUENE	µg/L	1000	TACO/620	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.495	0.414 J	0.25 U	0.25 U	0.25 U
VINYL CHLORIDE	µg/L	2	TACO/620	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Semivolatile Organic Compounds:																								
ACENAPHTHENE	µg/L	420	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.013 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0952 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
ACENAPHTHYLENE	µg/L	210	Non-TACO	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0952 U	NA	NA	NA	NA
ANTHRACENE	µg/L	2100	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.017 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0952 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U	0.0526 U
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.032 J	0.032 J	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0476 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0476 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0476 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
BENZO[G,H]IPERYLENE	µg/L	210	Non-TACO	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0926 U	0.0952 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0476 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
BIS[2-ETHYLHEXYL]PHTHALATE	µg/L	6	TACO/620	2.55 U	2.5 U	3.61 J	0.44 J	0.5 U	0.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.72 U	0.33 J	0.5 U	0.5 U	0.185 U	0.741 U	2.5 U	2.6 U	2.5 U	2.5 U
CHRYSENE	µg/L	1.5	TACO	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0926 U	0.0952 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0952 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
FLUORANTHENE	µg/L	280	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0952 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
FLUORENE	µg/L	280	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0952 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.031 J	0.0926 U	0.0952 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
NAPHTHALENE	µg/L	140	TACO/620	0.051 U	0.0532 U	0.0543 U	0.097 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0952 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
PHENANTHRENE	µg/L	210	Non-TACO	0.051 U	0.0532 U	0.0543 U	0.5 U	0.019 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.19 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
PYRENE	µg/L	210	TACO/620	0.051 U	0.0532 U	0.0543 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0926 U	0.0952 U	0.0526 U	0.0538 U	0.0526 U	0.0526 U
Dissolved Metals:																								
ALUMINUM	µg/L	3500	Non-TACO	NA	NA	NA	NA	100 U	100 U	NA	NA	24 U	NA	NA	NA	NA	NA	13 U	NA	49.6 J	NA	NA	NA	NA
ANTIMONY	µg/L	6	TACO/620	NA	NA	NA	NA	1 U	1 U	NA	NA	0.4 U	NA	NA	0.15 U	NA	NA	0.15 U	NA	2 U	NA	NA	NA	NA
ARSENIC	µg/L	10	620	NA	NA	NA	NA	2.1	11	NA	NA	27	NA	NA	NA	NA	NA	54	NA	53.8	NA	NA	NA	NA
BARIUM	µg/L	2000	TACO/620	NA	NA	NA	NA	260	320	NA	NA	240	NA	NA	NA	NA	NA	310	NA	308	NA	NA	NA	NA
BERYLLIUM	µg/L	4	TACO/620	NA	NA	NA	NA	1 U	1 U	NA	NA	0.31 U	NA	NA	NA	NA	NA	0.11 U	NA	0.5 U	NA	NA	NA	NA
CADMIUM	µg/L	5	TACO/620	NA	NA	NA	NA	0.2 U	0.2 U	NA	NA	0.06 U	NA	NA	NA	NA	NA	0.038 U	NA	0.5 U	NA	NA	NA	NA
CALCIUM	µg/L	--	--	NA	NA	NA	NA	170000	190000	NA	NA	190000	NA	NA	NA	NA	NA	190000	NA	166000	NA	NA	NA	NA
CHROMIUM, TOTAL	µg/L	100	TACO/620	NA	NA	NA	NA	1 U	2.7	NA	NA	1 U	NA	NA	NA	NA	NA	0.38 J	NA	1 U	NA	NA	NA	NA
COBALT	µg/L	1000	TACO/620	NA	NA	NA	NA	3.1	4.3	NA	NA	4.2	NA	NA	NA	NA	NA	4	NA	2.86 J	NA	NA	NA	NA
COPPER	µg/L	650	TACO/620	NA	NA	NA	NA	2.4 J	0.6	NA	NA	1.1	NA	NA	NA	NA	NA	0.4 J	NA	2 UJ	NA	NA	NA	NA
IRON	µg/L	5000	TACO/620	NA	NA	NA	NA	310	16000	NA	NA	18000	NA	NA	NA	NA	NA	22000	NA	15800	NA	NA	NA	NA
LEAD	µg/L	7.5	TACO/620	NA	NA	NA	NA	1 U	1 U	NA	NA	0.26 U	NA	NA	NA	NA	NA	0.15 U	NA	1.00 J	NA	NA	NA	NA
MAGNESIUM	µg/L	--	--	NA	NA	NA	NA	88000	97000	NA	NA	96000	NA	NA	NA	NA	NA	98000	NA	84600	NA	NA	NA	NA
MANGANESE	µg/L	150	TACO/620	NA	NA	NA	NA	73	85	NA	NA	76	NA	NA	NA	NA	NA	69	NA	120	NA	NA	NA	NA
MERCURY	µg/L	2	TACO/620	NA	NA	NA	NA	0.2 U	0.2 U	NA	NA	0.043 U	NA	NA	NA	NA	NA	0.055 U	NA	0.16 UJ	NA	NA	NA	NA
NICKEL	µg/L	100	TACO/620	NA	NA	NA	NA	16	22	NA	NA	20	NA	NA	NA	NA	NA	22	NA	14.9 J	NA	NA	NA	NA
POTASSIUM	µg/L	--	--	NA	NA	NA	NA	2000	2100	NA	NA	2000	NA	NA	NA	NA	NA	2200	NA	2250	NA	NA	NA	NA
SELENIUM	µg/L	50	TACO/620	NA	NA	NA	NA	1.6	1.1	NA	NA	2.3	NA	NA	NA	NA	NA	0.31 U	NA	1.25 U	NA	NA	NA	NA
SILVER	µg/L	50	TACO/620	NA	NA	NA	NA	0.2 U	0.2 UJ	NA	NA	0.053 U	NA	NA	NA	NA	NA	0.037 U	NA	0.5 UJ	NA	NA	NA	NA
SODIUM	µg/L	--	--	NA	NA	NA	NA	75																

Appendix B - Table 3  
Historical Groundwater Results for LTM  
Site 2 Forrestal Landfill Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 4	Round 5	Round 5	Round 6	Round 6	Round 7	Round 7	Round 8	Round 8	Round 9	Round 9	Round 10	Round 11	Round 12	Round 12	Round 13	Round 13	Round 14	Round 14	Round 15	Round 15	
		Screening Value	Source	FL-04 8/16/2007 FL-04_20070816 N	FL-04 11/13/2007 NTC02GW0405 N	FL-04 11/13/2007 NTC02GW0405-D FD	FL-04 2/26/2008 NTC02GW0406 N	FL-04 2/26/2008 NTC02GW0406-D FD	FL-04 5/7/2008 NTC02GW0407 N	FL-04 5/7/2008 NTC02GW0407-D FD	FL-04 8/21/2008 NTC02GW0408 N	FL-04 8/21/2008 NTC02GW0408-D FD	FL-04 11/19/2008 NTC02GW0409 N	FL-04 11/19/2008 NTC02GW0409-D FD	FL-04 5/18/2009 NTC02GW0410 N	FL-04 11/17/2009 NTC02GW0411 N	FL-04 5/5/2010 NTC02GW0412 N	FL-04 5/5/2010 NTC02GW0412-D FD	FL-04 11/17/2010 NTC02GW0413 N	FL-04 11/17/2010 NTC02GW0413-D FD	FL-04 5/18/2011 NTC02GW0414 N	FL-04 5/18/2011 NTC02GW0414-D FD	FL-04 5/2/2012 NTC02GW0415 N	FL-04 5/2/2012 NTC02GW0415-D FD	
Volatile Organic Compounds:																									
BENZENE	µg/L	5	TACO/620	1.23	1.2	1.2	0.91 J	0.88 J	0.73 J	1	1.4	1.4	1	1.3	0.66 J	1	0.71 J	0.68 J	1	1	0.45 J	0.44 J	0.72 J	0.73 J	
CIS-1,2-DICHLOROETHENE	µg/L	70	TACO/620	0.312 J	0.4 J	0.41 J	1 U	1 U	0.31 J	0.34 J	0.44 J	0.46 J	0.41 J	0.42 J	1 U	0.3 J	0.24 J	0.28 J	1 U	1 U	1 U	1 U	0.22 J	0.5 U	
TETRAHYDROFURAN	µg/L	340	RSL-Tap	25 U	14	13	19 J	18 J	11 J	13 J	14 J	13 J	13 J	12 J	11	12 J	10 J	9.6 J	9.1 J	8.2 J	4.4 J	4.8 J	9.9 J	9.7 J	
TOLUENE	µg/L	1000	TACO/620	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	
VINYL CHLORIDE	µg/L	2	TACO/620	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	
Semivolatile Organic Compounds:																									
ACENAPHTHENE	µg/L	420	TACO/620	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.02 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.05 U	0.051 J	
ACENAPHTHYLENE	µg/L	210	Non-TACO	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.05 U	0.05 U	
ANTHRACENE	µg/L	2100	TACO/620	0.0526 U	0.5 U	0.5 U	0.016 J	0.041 J	0.54 U	0.5 U	0.03 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.05 U	0.05 U	
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.11 J	0.042 J	0.04 J	0.091 J	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.11 J	0.5 U	0.5 U	0.5 U	0.071 J	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.041 J	0.041 J	
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.091 J	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.11 J	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	2.81 U	0.83	0.5 U	0.57	0.5 U	0.54 U	0.5 U	11 J	0.5 UJ	0.5 U	0.5 U	0.5 U	0.53 U	1 U	1 U	0.55	0.45 J	0.5 U	0.5 U	0.24 J	0.29 J	
CHRYSENE	µg/L	1.5	TACO	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	
FLUORANTHENE	µg/L	280	TACO/620	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.041 J	0.04 J	0.021 J	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.05 U	0.05 U	
FLUORENE	µg/L	280	TACO/620	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.041 J	0.081 J	0.5 U	0.02 J	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.031 J	0.05 U	
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.051 J	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.031 J	
NAPHTHALENE	µg/L	140	TACO/620	0.0526 U	0.059 J	0.095 J	0.5 U	0.5 U	0.054 J	0.031 J	0.02 J	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.05 U	0.05 U	
PHENANTHRENE	µg/L	210	Non-TACO	0.0526 U	0.5 U	0.5 U	0.5 U	0.047 J	0.022 J	0.5 U	0.04 J	0.5 U	0.5 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.031 J	0.05 U	
PYRENE	µg/L	210	TACO/620	0.0526 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.081 J	0.5 U	0.03 J	0.5 U	0.061 J	0.53 U	0.5 U	0.5 U	0.53 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	
Dissolved Metals:																									
ALUMINUM	µg/L	3500	Non-TACO	NA	NA	NA	100 U	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13 U	13 U	
ANTIMONY	µg/L	6	TACO/620	NA	NA	NA	1.1	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.64 U	0.63 U	
ARSENIC	µg/L	10	620	NA	NA	NA	7.2	6.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1	2	
BARIUM	µg/L	2000	TACO/620	NA	NA	NA	1500	1600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1200	1100	
BERYLLIUM	µg/L	4	TACO/620	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	0.11 U	
CADMIUM	µg/L	5	TACO/620	NA	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.038 U	0.038 U	
CALCIUM	µg/L	--	--	NA	NA	NA	230000 J	240000 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	190000	190000	
CHROMIUM, TOTAL	µg/L	100	TACO/620	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.8	1.7	
COBALT	µg/L	1000	TACO/620	NA	NA	NA	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.6	7.2	
COPPER	µg/L	650	TACO/620	NA	NA	NA	0.93 J	0.7 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.66 J	0.5 J	
IRON	µg/L	5000	TACO/620	NA	NA	NA	14000	14000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	12000	12000	
LEAD	µg/L	7.5	TACO/620	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	
MAGNESIUM	µg/L	--	--	NA	NA	NA	170000 J	170000 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	130000	130000	
MANGANESE	µg/L	150	TACO/620	NA	NA	NA	150	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	110	110	
MERCURY	µg/L	2	TACO/620	NA	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.055 U	0.055 U	
NICKEL	µg/L	100	TACO/620	NA	NA	NA	22	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	12	12	
POTASSIUM	µg/L	--	--	NA	NA	NA	36000	37000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30000	29000	
SELENIUM	µg/L	50	TACO/620	NA	NA	NA	4.6 J	8.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	
SILVER	µg/L	50	TACO/620	NA	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.037 U	0.037 U	
SODIUM	µg/L	--	--	NA	NA	NA	420000 J	440000 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	320000	310000	
THALLIUM	µg/L	2	TACO/620	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.027 U	0.027 U	
VANADIUM	µg/L	49	TACO/620	NA	NA	NA	2.6	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				

Appendix B - Table 3  
Historical Groundwater Results for LTM  
Site 2 Forrestal Landfill Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 16	Round 17	Round 17	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10	Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 16	Round 17
		Screening Value	Source	FL-04 5/15/2013 FL-04-20130515 N	FL-04 5/20/2014 DUP-20140520 FD	FL-04 5/20/2014 FL-04-20140520 N	FL-05 8/17/2006 FL-05_20060817 N	FL-05 39092 FL-05_20070110 N	FL-05 4/25/2007 FL-05_20070425 N	FL-05 8/9/2007 FL-05_20070809 N	FL-05 11/13/2007 NTC02GW0505 N	FL-05 2/25/2008 NTC02GW0506 N	FL-05 5/7/2008 NTC02GW0507 N	FL-05 8/20/2008 NTC02GW0508 N	FL-05 11/18/2008 NTC02GW0509 N	FL-05 5/19/2009 NTC02GW0510 N	FL-05 11/16/2009 NTC02GW0511 N	FL-05 5/6/2010 NTC02GW0512 N	FL-05 11/18/2010 NTC02GW0513 N	FL-05 5/19/2011 NTC02GW0514 N	FL-05 5/2/2012 NTC02GW0515 N	FL-05 5/13/2013 DUP-20130513 FD	FL-05 5/13/2013 FL-05-20130513 N	FL-05 5/21/2014 FL-05-20140521 N
Volatile Organic Compounds:																								
BENZENE	µg/L	5	TACO/620	0.660 J	1 U	1 U	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	µg/L	70	TACO/620	0.5 U	1 U	1 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRAHYDROFURAN	µg/L	340	RSL-Tap	11.2	5 U	5 U	25 U	25 U	25 U	25 U	5 U	5 UR	5 UR	5 UJ	5 UR	5 U	5 UR	5 UR	5 UR	5 UR	1 UR	2.5 U	2.5 U	2.5 U
TOLUENE	µg/L	1000	TACO/620	0.5 U	1 U	1 U	-99 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	µg/L	2	TACO/620	0.25 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.25 U	0.25 U	0.25 U
Semivolatile Organic Compounds:																								
ACENAPHTHENE	µg/L	420	TACO/620	0.098 U	0.0952 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.02 J	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0943 U	0.0943 U	0.098 U
ACENAPHTHYLENE	µg/L	210	Non-TACO	0.098 U	0.0952 U	0.0962 U	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0943 U	0.0943 U	0.098 U
ANTHRACENE	µg/L	2100	TACO/620	0.098 U	0.0952 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.02 J	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0943 U	0.0943 U	0.098 U
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.049 U	0.0476 U	0.0481 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.039 J	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0472 U	0.0472 U	0.049 U
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.049 U	0.0476 U	0.0481 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.029 J	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0472 U	0.0472 U	0.049 U
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.049 U	0.0476 U	0.0481 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0472 U	0.0472 U	0.049 U
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	0.098 U	0.0952 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0943 U	0.0943 U	0.098 U
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.049 U	0.0476 U	0.0481 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0472 U	0.0472 U	0.049 U
BIS[2-ETHYLHEXYL]PHTHALATE	µg/L	6	TACO/620	0.196 U	0.634 U	0.69 U	2.5 U	2.5 U	2.5 U	2.75 U	1.6	0.43 J	0.5 U	0.5 U	0.5 U	2	0.5 U	0.92 U	0.46 J	0.5 U	0.29 J	0.189 U	0.189 U	0.719 UJ
CHRYSENE	µg/L	1.5	TACO	0.098 U	0.0952 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.029 J	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0943 U	0.0943 U	0.098 U
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.049 U	0.0952 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0472 U	0.0472 U	0.098 U
FLUORANTHENE	µg/L	280	TACO/620	0.098 U	0.0952 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.039 J	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0943 U	0.0943 U	0.098 U
FLUORENE	µg/L	280	TACO/620	0.098 U	0.0952 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0943 U	0.0943 U	0.098 U
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.098 U	0.0952 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0943 U	0.0943 U	0.098 U
NAPHTHALENE	µg/L	140	TACO/620	0.098 U	0.0952 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.059 J	0.5 U	1.1	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.082 J	0.0943 U	0.0943 U	0.0853 J
PHENANTHRENE	µg/L	210	Non-TACO	0.098 U	0.19 U	0.192 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.069 J	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.031 J	0.0943 U	0.0943 U	0.196 U
PYRENE	µg/L	210	TACO/620	0.098 U	0.0952 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0943 U	0.0943 U	0.098 U
Dissolved Metals:																								
ALUMINUM	µg/L	3500	Non-TACO	NA	123 J	124 J	NA	NA	NA	NA	44 U	100 U	100 U	NA	100 U	NA	100 U	23 U	28 U	100 U	13 U	NA	NA	59.7
ANTIMONY	µg/L	6	TACO/620	NA	1.87 J	1.73 J	NA	NA	NA	NA	0.91 U	1 U	1 U	NA	1 U	NA	1 U	0.36 U	0.36 U	1 U	0.15 U	NA	NA	2 U
ARSENIC	µg/L	10	620	NA	1.5 U	1.5 U	NA	NA	NA	NA	4.3	4.9	4.7	NA	6.5	NA	6.9	7.1	5.2	5.7	6	NA	NA	5.16
BARIUM	µg/L	2000	TACO/620	NA	1360	1390	NA	NA	NA	NA	34	40	35	NA	39	NA	50	61	48	51	56	NA	NA	48.3
BERYLLIUM	µg/L	4	TACO/620	NA	0.5 U	0.5 U	NA	NA	NA	NA	0.31 U	1 U	1 U	NA	1 U	NA	1 U	0.3 U	0.3 U	1 U	0.11 U	NA	NA	0.5 U
CADMIUM	µg/L	5	TACO/620	NA	2.5 U	2.5 U	NA	NA	NA	NA	0.07	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	0.055 U	0.055 U	0.2 U	0.039 J	NA	NA	0.5 U
CALCIUM	µg/L	--	--	NA	212000	215000	NA	NA	NA	NA	57000 J	78000 J	68000	NA	65000 J	NA	63000	88000 J	76000	98000	89000	NA	NA	86400
CHROMIUM, TOTAL	µg/L	100	TACO/620	NA	5 UJ	5 UJ	NA	NA	NA	NA	0.54 U	1 U	0.87	NA	1 U	NA	0.57	0.46 U	0.65 U	1 U	0.56 J	NA	NA	1 U
COBALT	µg/L	1000	TACO/620	NA	8.54	8.66	NA	NA	NA	NA	0.64	0.85	0.71	NA	0.68	NA	1.1	2.4	1.6	2.5	2.4	NA	NA	1.91 J
COPPER	µg/L	650	TACO/620	NA	2 UJ	2 UJ	NA	NA	NA	NA	1	0.88 J	0.74	NA	0.78	NA	0.96	1.1	0.71 U	0.36 J	0.27 J	NA	NA	1.62 J
IRON	µg/L	5000	TACO/620	NA	11600	11700	NA	NA	NA	NA	290 J	420	330	NA	380	NA	630	1500	1300	2400	2100	NA	NA	2320
LEAD	µg/L	7.5	TACO/620	NA	1.29 J	1.12 J	NA	NA	NA	NA	0.33 U	1 U	1 U	NA	1 U	NA	1 U	0.22 U	0.22 U	1 U	0.15 U	NA	NA	0.528 J
MAGNESIUM	µg/L	--	--	NA	157000	159000	NA	NA	NA	NA	43000 J	59000 J	54000	NA	52000 J	NA	46000	57000 J	52000	54000	48000	NA	NA	50100
MANGANESE	µg/L	150	TACO/620	NA	115	121	NA	NA	NA	NA	24	17	11	NA	11	NA	25	78	53	120	120	NA	NA	107
MERCURY	µg/L	2	TACO/620	NA	0.16 UJ	0.16 UJ	NA	NA	NA	NA	0.053 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	0.061 U	0.061 U	0.079 J	0.055 U	NA	NA	0.16 U
NICKEL	µg/L	100	TACO/620	NA	16.6 J	17.2 J	NA	NA	NA	NA	3.5	5.9	4.6	NA	3.3	NA	4.1	5.1	3.2	4.1	3.3	NA	NA	2.49 J
POTASSIUM	µg/L	--	--	NA	33200	33900	NA	NA	NA	NA	1600	1600	1600	NA	1700	NA	1600	1400 J	1600	1300	1400	NA	NA	1530
SELENIUM	µg/L	50	TACO/620	NA	1.25 U	1.25 U	NA	NA	NA	NA	0													

Appendix B - Table 3  
Historical Groundwater Results for LTM  
Site 2 Forrestal Landfill Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10	Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17
		Screening Value	Source	FL-06 8/21/2006 FL-06_20060821 N	FL-06 39101 FL-06_20070119 N	FL-06 4/17/2007 FL-06_20070417 N	FL-06 8/14/2007 FL-06_20070814 N	FL-06 11/13/2007 NTC02GW0605 N	FL-06 2/27/2008 NTC02GW0606 N	FL-06 5/7/2008 NTC02GW0607 N	FL-06 8/21/2008 NTC02GW0608 N	FL-06 11/19/2008 NTC02GW0609 N	FL-06 5/18/2009 NTC02GW0610 N	FL-06 11/17/2009 NTC02GW0611 N	FL-06 5/5/2010 NTC02GW0612 N	FL-06 11/17/2010 NTC02GW0613 N	FL-06 5/18/2011 NTC02GW0614 N	FL-06 5/2/2012 NTC02GW0615 N	FL-06 5/15/2013 FL-06-20130515 N	FL-06 5/20/2014 FL-06-20140520 N
Volatile Organic Compounds:																				
BENZENE	µg/L	5	TACO/620	0.125 U	0.125 U	0.125 U	0.125 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	µg/L	70	TACO/620	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U
TETRAHYDROFURAN	µg/L	340	RSL-Tap	25 U	25 U	25 U	25 U	5 U	5 UR	5 UR	5 UJ	5 UR	5 U	5 UR	5 UR	5 UR	5 UR	1 UR	2.5 U	2.5 U
TOLUENE	µg/L	1000	TACO/620	1.79	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	µg/L	2	TACO/620	0.25 U	0.25 U	0.25 U	0.25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.25 U	0.25 U
Semivolatile Organic Compounds:																				
ACENAPHTHENE	µg/L	420	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.019 J	0.5 U	0.072 J	0.5 U	0.062 J	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0943 U
ACENAPHTHYLENE	µg/L	210	Non-TACO	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0943 U
ANTHRACENE	µg/L	2100	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0943 U
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.03 J	0.041 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0472 U
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0472 U
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0472 U
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0926 U	0.0943 U
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0472 U
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	2.5 U	2.5 U	2.5 U	2.55 U	0.5 U	0.5 U	0.5 U	0.8	0.5 U	0.5 U	0.5 U	0.73 U	0.32 J	0.23 J	0.21 J	0.185 U	0.659 U
CHRYSENE	µg/L	1.5	TACO	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.03 J	0.031 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0926 U	0.0943 U
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0943 U
FLUORANTHENE	µg/L	280	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.5 U	0.031 J	0.5 U	0.062 J	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0943 U
FLUORENE	µg/L	280	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0943 U
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0926 U	0.0943 U
NAPHTHALENE	µg/L	140	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.057 J	0.5 U	0.5 U	0.01 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0943 U
PHENANTHRENE	µg/L	210	Non-TACO	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.02 J	0.021 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.189 U
PYRENE	µg/L	210	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0568 U	0.5 U	0.5 U	0.5 U	0.03 J	0.031 J	0.5 U	0.3 J	0.5 U	0.5 U	0.5 U	0.1 U	0.0926 U	0.0943 U
Dissolved Metals:																				
ALUMINUM	µg/L	3500	Non-TACO	NA	NA	NA	NA	44 U	660	31	100 U	100 U	NA	100 U	23 U	28 U	220	13 U	NA	25 U
ANTIMONY	µg/L	6	TACO/620	NA	NA	NA	NA	0.44 U	1 U	1 U	0.45 U	1 U	NA	1 U	0.36 U	0.36 U	1 U	0.15 U	NA	2 U
ARSENIC	µg/L	10	620	NA	NA	NA	NA	0.74 U	3 U	0.35	0.38 U	0.36	NA	0.56	0.38 U	0.38 U	0.46 J	0.29 J	NA	1.5 U
BARIUM	µg/L	2000	TACO/620	NA	NA	NA	NA	80	79	76	61	72	NA	67	74	52	62	61	NA	67.4
BERYLLIUM	µg/L	4	TACO/620	NA	NA	NA	NA	0.31 U	1 U	1 U	1 U	1 U	NA	1 U	0.3 U	0.3 U	1 U	0.11 U	NA	0.5 U
CADMIUM	µg/L	5	TACO/620	NA	NA	NA	NA	0.062 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.055 U	0.055 U	0.2 U	0.038 U	NA	0.5 U
CALCIUM	µg/L	--	--	NA	NA	NA	NA	120000 J	120000	120000	130000	120000 J	NA	110000	130000 J	130000	130000	140000	NA	120000
CHROMIUM, TOTAL	µg/L	100	TACO/620	NA	NA	NA	NA	1.7	1 U	0.97	1 U	1 U	NA	1.6	0.63 U	0.65 U	0.59 J	0.2 U	NA	1 U
COBALT	µg/L	1000	TACO/620	NA	NA	NA	NA	0.67	0.79	0.29	0.1	0.24	NA	0.29	0.26 J	0.23 J	0.28 J	0.11 J	NA	2.5 U
COPPER	µg/L	650	TACO/620	NA	NA	NA	NA	1.2	2 J	1.5	1.6 U	1.7	NA	2.7	1.7	1.9	1.2	1	NA	1.33 J
IRON	µg/L	5000	TACO/620	NA	NA	NA	NA	5.7 U	720	20 U	20 U	20 U	NA	20 U	4.4 J	12 J	440	12	NA	15 U
LEAD	µg/L	7.5	TACO/620	NA	NA	NA	NA	0.33 U	1 U	1 U	1 U	1 U	NA	1 U	0.22 U	0.22 U	1 U	0.15 U	NA	0.748 J
MAGNESIUM	µg/L	--	--	NA	NA	NA	NA	62000 J	66000	67000	72000	66000 J	NA	62000	70000 J	76000	70000	76000	NA	68400
MANGANESE	µg/L	150	TACO/620	NA	NA	NA	NA	220	130	51	41	86	NA	81	92	75	67	38	NA	11.5
MERCURY	µg/L	2	TACO/620	NA	NA	NA	NA	0.046 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.061 U	0.061 U	0.2 U	0.055 U	NA	0.16 UJ
NICKEL	µg/L	100	TACO/620	NA	NA	NA	NA	4.6	5.2	4.7	3.7	3.6	NA	7.1	3.5	4.6	3.1	2.5	NA	0.879 J
POTASSIUM	µg/L	--	--	NA	NA	NA	NA	2500	2400	2400	2000	2300	NA	1800	1900	1900	1800	1700	NA	1700
SELENIUM	µg/L	50	TACO/620	NA	NA	NA	NA	0.92 U	1 U	1 U	0.61 UJ	1 U	NA	1 U	0.82 U	0.92 J	1 U	0.76 U	NA	1.25 U
SILVER	µg/L	50	TACO/620	NA	NA	NA	NA	0.12 U	0.2 U	0.2 UJ	0.2 U	0.68	NA	0.2 U	0.061 U	0.061 U	0.2 U	0.037 U	NA	0.5 UJ
SODIUM	µg/L	--	--	NA	NA	NA	NA	64000 J	59000	51000	37000	49000 J	NA	33000	38000 J	32000	36000	29000	NA	27600
THALLIUM	µg/L	2	TACO/620	NA	NA	NA	NA	0.19	1 U	0.092	0.071 J	0.13	NA	0.053	0.1 J	0.1 J	1 U	0.081 J	NA	1 U
VANADIUM	µg/L	49	TACO/620	NA	NA	NA	NA	2	1.4	0.51	0.28 J	3.7	NA	3 U	0.35 J	0.33 J	0.73 J	0.16 J	NA	2.5 U
ZINC	µg/L	5000	TACO/620	NA	NA	NA	NA	10 J	20 U	20 U	8 UJ	3	NA	20 U	5.3 J	3 J	11 J	15 U	NA	2.5 UJ
Miscellaneous Parameters:																				
AMMONIA	mg/L as N	30	SMCL	0.194	0.125	0.05 U	0.142	0.19	0.088	0.14	0.21	0.22	0.15 U	0.055 J	0.017 J	0.049	0.046 J	0.081	0.0841 J	0.15 U
CHLORIDE	mg/L	200	TACO/620	26.6	28.2	27.6	29	25	27	29	29	27	30	32	28	29	27	28	50.3	42.2
NITRATE	mg/L as N	10	TACO/620	NA	NA	NA	NA	0.1 U	0.16	0.048 J	0.02 U	0.1 U	0.057	0.072	0.058 J	0.05 U	0.046 J	0.081 J	NA	0.0790 J
SULFATE	mg/L	400	TACO/620	313	326	284	279	250	250	260	270 J	260	300	260	280	260	250	260	179	188
TOTAL DISSOLVED SOLIDS	mg/L	500	SMCL	904	872	862	902	780	800	850	910	780	870	830	820	870	788	860	701	691
TOTAL SUSPENDED SOLIDS	mg/L	--	--	2.5 U	13	40.5	9	140 J	160	43	270	230	53	54	35	35	52.2	24.4	25.2 J	10 U
Field Parameters:																				
DISSOLVED OXYGEN	mg/L	--	--	NA	NA	NA	NA	0.2	1.59	0.6	0.37									

**Historical Groundwater Results for LTM Parameters  
Site 2 Forrestal Landfill  
Naval Station Great Lakes, IL**

Notes:

U - nondetect

J - estimated value

R - Rejected

UJ - estimated limit of detection (LOD)

Results exceeding screening are highlighted and in bold.

TACO = Illinois EPA Tiered Approach to Corrective Action Objectives, taken from Illinois Administrative Code 35, Chapter I, Section 742, Appendix B, Table E (IEPA 2007).

RSLs = USEPA Regions 3, 6, and 9 Regional Screen Level, (May 2013).

620 = Illinois EPA Class I Potable Resource Groundwater, taken from Illinois Administrative Code 35, Chapter I, Section 620, Subpart D (IEPA 2012).

If two sources of criteria are listed, the values are the same for the sources listed.

RSL-Tap: Regional Screening Level, Tapwater

TACO: Tiered Approach to Corrective Action Objectives, Soil Component of Groundwater Ingestion Exposure Route Class I

SMCL: USEPA Secondary Maximum Containment Level

Non-TACO: GRO not promulgated under 35 IAC 742

**Appendix B - Table 4**  
**Summary of Detections and Criteria for Long Term Groundwater Monitoring Results from May 2014 (Round 17)**  
**Site 3 Suppliside Landfill, Naval Station Great Lakes, Illinois**

Analyte	Units	Criteria		Round 17 SL-01 5/20/2014 SSL-01- 20140520 N	Round 17 SL-02 5/21/2014 SSL-02- 20140521 N	Round 17 SL-03 5/20/2014 SSL-03- 20140520 N	Round 17 SL-04 5/20/2014 SSL-04- 20140520 N	Round 17 SL-04 5/20/2014 DUP2- 20140520 FD	Round 17 SL-05 5/20/2014 SSL-05- 20140520 N	Round 17 SL-06 5/21/2014 SSL-06- 20140521 N
		Screening Value	Source							
Semivolatile Organic Compounds:										
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.0495 U	0.05 U	0.0258 J	0.0516 J	NA	0.0481 U	0.0481 U
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.0495 U	0.05 U	0.0481 U	0.0288 J	NA	0.0481 U	0.0481 U
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.0495 U	0.05 U	0.0481 U	0.0654 J	NA	0.0257 J	0.0481 U
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.0495 U	0.05 U	0.0481 U	0.0397 J	NA	0.0481 U	0.0481 U
FLUORANTHENE	µg/L	280	TACO/620	0.099 U	0.1 U	0.0962 U	0.0562 J	NA	0.0962 U	0.0962 U
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.099 U	0.1 U	0.0962 U	0.0488 J	NA	0.0962 U	0.0962 U
PYRENE	µg/L	210	TACO/620	0.099 U	0.1 U	0.0962 U	0.0549 J	NA	0.0962 U	0.0962 U
Herbicides:										
MCPA	µg/L	3.5	Non-TACO	49 U	49 U	32.2 J	30.6 J	48.1 U	47.2 U	46.3 U
Dissolved Metals:										
ALUMINUM	µg/L	3500	Non-TACO	14.5 J	28.7 J	26.3 J	31.6 J	NA	34.7 J	45.3 J
ARSENIC	µg/L	10	620	1.5 U	2.9	1.5 U	1.5 U	NA	1.5 U	4.46
BARIUM	µg/L	2000	TACO/620	66.5	39.2	21.6	70.9	NA	383	69.8
CALCIUM	µg/L	--	--	117000	47500	78300	70200	NA	204000	154000
COBALT	µg/L	1000	TACO/620	2.5 U	2.5 U	2.5 U	2.5 U	NA	2.45 J	2.5 U
COPPER	µg/L	650	TACO/620	1.11 J	1.27 J	2 UJ	1.24 J	NA	2 UJ	1.19 J
IRON	µg/L	5000	TACO/620	641	123	10.1 J	454	NA	13200	5020
LEAD	µg/L	7.5	TACO/620	0.749 J	0.75 U	0.417 J	0.449 J	NA	1.08 J	0.62 J
MAGNESIUM	µg/L	--	--	67600	28100	83200	53100	NA	91700	54100
MANGANESE	µg/L	150	TACO/620	90.3	27.2	13	13.9	NA	479	557
NICKEL	µg/L	100	TACO/620	0.842 J	2.25 J	1.5 UJ	0.92 J	NA	8.14 J	2.54 J
POTASSIUM	µg/L	--	--	1540	9110	2540	1930	NA	7960	1210 J
SODIUM	µg/L	--	--	33800	352000	50400	30400	NA	94300	74200
VANADIUM	µg/L	49	TACO/620	2.5 U	2.5 U	2.5 U	2.5 U	NA	1.25 J	2.5 U
ZINC	µg/L	5000	TACO/620	2.5 UJ	2.5 UJ	2.5 UJ	1.37 J	NA	3.42 J	11.4 J
Miscellaneous Parameters:										
AMMONIA	mg/L as N	30	SMCL	0.232 J	0.228 J	0.331	0.205 J	NA	14.2	0.226 J
CHLORIDE	mg/L	200	TACO/620	9.5	449	20.9	13.5	NA	113	159
NITRATE	mg/L as N	10	TACO/620	0.1 U	0.1 U	0.1 U	0.195 J	NA	0.1 U	0.1 U
SULFATE	mg/L	400	TACO/620	228	106	370	83.8	NA	112	135
TOTAL DISSOLVED SOLIDS	mg/L	500	SMCL	739	1150	757	20 U	NA	1130	817
TOTAL SUSPENDED SOLIDS	mg/L	--	--	26	10 U	54	10 U	NA	10 U	212
Field Parameters:										
DISSOLVED OXYGEN	mg/L	--	--	0.47	0.66	0.69	0.53	NA	1.29	2.02
OXIDATION REDUCTION POTENTIAL	mV	--	--	-138.1	-76.7	-266.8	8.6	NA	-72.2	-18.1
PH	SU	6.5-8.5	SMCL	7.27	8.01	7.96	7.36	NA	7.28	6.62
SPECIFIC CONDUCTANCE	mS/cm	--	--	1.013	2.153	1.254	0.718	NA	1.773	1.255
TEMPERATURE	°C	--	--	12.55	14.3	13.84	13.29	NA	12.56	11.79
TURBIDITY	NTU	--	--	21.6	19.3	81.6	10.1	NA	6.02	291

**Notes:**

U - nondetect

J - estimated value

UJ - estimated limit of detection (LOD)

Results exceeding screening are highlighted and in bold.

TACO = Illinois EPA Tiered Approach to Corrective Action Objectives, taken from Illinois Administrative Code 35, Chapter I, Section 742, Appendix B, Table E (IEPA 2007).

RSLs = USEPA Regions 3, 6, and 9 Regional Screen Level, (May 2014).

620 = Illinois EPA Class I Potable Resource Groundwater, taken from Illinois Administrative Code 35, Chapter I, Section 620, Subpart D (IEPA 2012).

If two sources of criteria are listed, the values are the same for the sources listed.

RSL-Tap: Regional Screening Level, Tapwater

TACO: Tiered Approach to Corrective Action Objectives, Soil Component of Groundwater Ingestion Exposure Route Class I

SMCL: USEPA Secondary Maximum Containment Level

Non-TACO: GRO not promulgated under 35 IAC 742

**Appendix B - Table 5**  
**Groundwater Results from May 2014 (Round 17) Long Term Monitoring**  
**Site 3 Supplyside Landfill, Naval Station Great Lakes, Illinois**

Analyte	Units	Criteria		Round 17 SL-01 5/20/2014 SSL-01- 20140520 N	Round 17 SL-02 5/21/2014 SSL-02- 20140521 N	Round 17 SL-03 5/20/2014 SSL-03- 20140520 N	Round 17 SL-04 5/20/2014 SSL-04- 20140520 N	Round 17 SL-04 5/20/2014 DUP2- 20140520 FD	Round 17 SL-05 5/20/2014 SSL-05- 20140520 N	Round 17 SL-06 5/21/2014 SSL-06- 20140521 N
		Screening Value	Source							
Semivolatile Organic Compounds:										
ACENAPHTHENE	µg/L	420	TACO/620	0.099 U	0.1 U	0.0962 U	0.0962 U	NA	0.0962 U	0.0962 U
ACENAPHTHYLENE	µg/L	210	Non-TACO	0.099 U	0.1 U	0.0962 U	0.0962 U	NA	0.0962 U	0.0962 U
ANTHRACENE	µg/L	2100	TACO/620	0.099 U	0.1 U	0.0962 U	0.0962 U	NA	0.0962 U	0.0962 U
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.0495 U	0.05 U	0.0258 J	0.0516 J	NA	0.0481 U	0.0481 U
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.0495 U	0.05 U	0.0481 U	0.0288 J	NA	0.0481 U	0.0481 U
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.0495 U	0.05 U	0.0481 U	0.0654 J	NA	0.0257 J	0.0481 U
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	0.099 U	0.1 U	0.0962 U	0.0962 U	NA	0.0962 U	0.0962 U
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.0495 U	0.05 U	0.0481 U	0.0397 J	NA	0.0481 U	0.0481 U
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	0.685 UJ	0.667 UJ	0.679 UJ	0.758 U	NA	0.698 U	0.707 UJ
CHRYSENE	µg/L	1.5	TACO	0.099 U	0.1 U	0.0962 U	0.0962 U	NA	0.0962 U	0.0962 U
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.099 U	0.1 U	0.0962 U	0.0962 U	NA	0.0962 U	0.0962 U
FLUORANTHENE	µg/L	280	TACO/620	0.099 U	0.1 U	0.0962 U	0.0562 J	NA	0.0962 U	0.0962 U
FLUORENE	µg/L	280	TACO/620	0.099 U	0.1 U	0.0962 U	0.0962 U	NA	0.0962 U	0.0962 U
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.099 U	0.1 U	0.0962 U	0.0488 J	NA	0.0962 U	0.0962 U
NAPHTHALENE	µg/L	140	TACO/620	0.099 U	0.1 U	0.0962 U	0.0962 U	NA	0.0962 U	0.0962 U
PHENANTHRENE	µg/L	210	Non-TACO	0.198 U	0.2 U	0.192 U	0.192 U	NA	0.192 U	0.192 U
PYRENE	µg/L	210	TACO/620	0.099 U	0.1 U	0.0962 U	0.0549 J	NA	0.0962 U	0.0962 U
Herbicides:										
MCPA	µg/L	3.5	Non-TACO	49 U	49 U	32.2 J	30.6 J	48.1 U	47.2 U	46.3 U
MCPP	µg/L	7	620	49 UJ	49 UJ	49 UJ	47.2 UJ	48.1 UJ	47.2 UJ	46.3 UJ
Dissolved Metals:										
ALUMINUM	µg/L	3500	Non-TACO	14.5 J	28.7 J	26.3 J	31.6 J	NA	34.7 J	45.3 J
ANTIMONY	µg/L	6	TACO/620	2 U	2 U	2 U	2 U	NA	2 U	2 U
ARSENIC	µg/L	10	620	1.5 U	2.9	1.5 U	1.5 U	NA	1.5 U	4.46
BARIUM	µg/L	2000	TACO/620	66.5	39.2	21.6	70.9	NA	383	69.8
BERYLLIUM	µg/L	4	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U
CADMIUM	µg/L	5	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.75 U	0.5 U
CALCIUM	µg/L	--	--	117000	47500	78300	70200	NA	204000	154000
CHROMIUM, TOTAL	µg/L	100	TACO/620	1 U	1 U	1 U	1 U	NA	1 U	1 U
COBALT	µg/L	1000	TACO/620	2.5 U	2.5 U	2.5 U	2.5 U	NA	2.45 J	2.5 U
COPPER	µg/L	650	TACO/620	1.11 J-	1.27 J-	2 UJ	1.24 J-	NA	2 UJ	1.19 J-
IRON	µg/L	5000	TACO/620	641	123	10.1 J	454	NA	13200	5020
LEAD	µg/L	7.5	TACO/620	0.749 J+	0.75 U	0.417 J+	0.449 J+	NA	1.08 J+	0.62 J+
MAGNESIUM	µg/L	--	--	67600	28100	83200	53100	NA	91700	54100
MANGANESE	µg/L	150	TACO/620	90.3	27.2	13	13.9	NA	479	557
MERCURY	µg/L	2	TACO/620	0.16 UJ	0.16 U	0.16 UJ	0.16 UJ	NA	0.16 UJ	0.16 U
NICKEL	µg/L	100	TACO/620	0.842 J-	2.25 J-	1.5 UJ	0.92 J-	NA	8.14 J-	2.54 J-
POTASSIUM	µg/L	--	--	1540	9110	2540	1930	NA	7960	1210 J
SELENIUM	µg/L	50	TACO/620	1.25 U	1.25 U	1.25 U	1.25 U	NA	1.25 U	1.25 U
SILVER	µg/L	50	TACO/620	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	NA	0.5 UJ	0.5 UJ
SODIUM	µg/L	--	--	33800	352000	50400	30400	NA	94300	74200
THALLIUM	µg/L	2	TACO/620	1 U	1 U	1 U	1 U	NA	1 U	1 U
VANADIUM	µg/L	49	TACO/620	2.5 U	2.5 U	2.5 U	2.5 U	NA	1.25 J	2.5 U
ZINC	µg/L	5000	TACO/620	2.5 UJ	2.5 UJ	2.5 UJ	1.37 J-	NA	3.42 J-	11.4 J-

**Appendix B - Table 5**  
**Groundwater Results from May 2014 (Round 17) Long Term Monitoring**  
**Site 3 Supplyside Landfill, Naval Station Great Lakes, Illinois**

Analyte	Units	Criteria		Round 17 SL-01 5/20/2014 SSL-01- 20140520 N	Round 17 SL-02 5/21/2014 SSL-02- 20140521 N	Round 17 SL-03 5/20/2014 SSL-03- 20140520 N	Round 17 SL-04 5/20/2014 SSL-04- 20140520 N	Round 17 SL-04 5/20/2014 DUP2- 20140520 FD	Round 17 SL-05 5/20/2014 SSL-05- 20140520 N	Round 17 SL-06 5/21/2014 SSL-06- 20140521 N
		Screening Value	Source							
Miscellaneous Parameters:										
AMMONIA	mg/L as N	30	SMCL	0.232 J	0.228 J	0.331	0.205 J	NA	14.2	0.226 J
CHLORIDE	mg/L	200	TACO/620	9.5	449	20.9	13.5	NA	113	159
NITRATE	mg/L as N	10	TACO/620	0.1 U	0.1 U	0.1 U	0.195 J	NA	0.1 U	0.1 U
SULFATE	mg/L	400	TACO/620	228	106	370	83.8	NA	112	135
TOTAL DISSOLVED SOLIDS	mg/L	500	SMCL	739	1150	757	20 U	NA	1130	817
TOTAL SUSPENDED SOLIDS	mg/L	--	--	26	10 U	54	10 U	NA	10 U	212
Field Parameters:										
DISSOLVED OXYGEN	mg/L	--	--	0.47	0.66	0.69	0.53	NA	1.29	2.02
OXIDATION REDUCTION POTEN	mV	--	--	-138.1	-76.7	-266.8	8.6	NA	-72.2	-18.1
PH	SU	6.5-8.5	SMCL	7.27	8.01	7.96	7.36	NA	7.28	6.62
SPECIFIC CONDUCTANCE	mS/cm	--	--	1.013	2.153	1.254	0.718	NA	1.773	1.255
TEMPERATURE	°C	--	--	12.55	14.3	13.84	13.29	NA	12.56	11.79
TURBIDITY	NTU	--	--	21.6	19.3	81.6	10.1	NA	6.02	291

Notes:

U - nondetect

J - estimated value

UJ - estimated limit of detection (LOD)

Results exceeding screening are highlighted and in bold.

TACO = Illinois EPA Tiered Approach to Corrective Action Objectives, taken from Illinois Administrative Code 35, Chapter I, Section 742, Appendix B, Table E (IEPA 2007).

RSLs = USEPA Regions 3, 6, and 9 Regional Screen Level, (May 2014).

620 = Illinois EPA Class I Potable Resource Groundwater, taken from Illinois Administrative Code 35, Chapter I, Section 620, Subpart D (IEPA 2012).

If two sources of criteria are listed, the values are the same for the sources listed.

RSL-Tap: Regional Screening Level, Tapwater

TACO: Tiered Approach to Corrective Action Objectives, Soil Component of Groundwater Ingestion Exposure Route Class I

SMCL: USEPA Secondary Maximum Containment Level

Non-TACO: GRO not promulgated under 35 IAC 742

Appendix B - Table 6  
Historical Groundwater Results for Long Term Monitoring  
Site 3 Supplyside Landfill, Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10	Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 1	Round 2	Round 3	Round 4	
		Screening Value	Source	SL-01 8/1/2006	SL-01 1/15/2007	SL-01 4/26/2007	SL-01 7/31/2007	SL-01 11/15/2007	SL-01 2/27/2008	SL-01 5/6/2008	SL-01 8/18/2008	SL-01 11/17/2008	SL-01 5/20/2009	SL-01 11/19/2009	SL-01 5/3/2010	SL-01 11/15/2010	SL-01 5/16/2011	SL-01 5/1/2012	SL-01 5/14/2013	SL-01 5/20/2014	SL-02 NA	SL-02 NA	SL-02 NA	SL-02 NA	
				SL-01_20060801 N	SL-01_20070115 N	SL-01_20070426 N	SL-01_20070731 N	NTC03GW0105 N	NTC03GW0106 N	NTC03GW0107 N	NTC03GW0108 N	NTC03GW0109 N	NTC03GW0110 N	NTC03GW0111 N	NTC03GW0112 N	NTC03GW0113 N	NTC03GW0114 N	NTC03GW0115 N	SSL-01-20130514 N	SSL-01-20140520 N	NA	NA	NA	NA	
Semivolatile Organic Compounds:																									
ACENAPHTHENE	µg/L	420	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0943 U	0.099 U	NA	NA	NA	NA	
ACENAPHTHYLENE	µg/L	210	Non-TACO	NA	NA	NA	NA	0.54 U	0.5 U	0.5 U	NA	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0943 U	0.099 U	NA	NA	NA	NA	
ANTHRACENE	µg/L	2100	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0943 U	0.099 U	NA	NA	NA	NA	
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.05 J	0.052 J	0.033 J	0.5 U	0.5 U	0.5 U	0.14 J	0.051 J	0.1 U	0.0472 U	0.0495 U	NA	NA	NA	NA	
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.041 J	0.0472 U	0.0495 U	NA	NA	NA	NA		
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	NA	NA	NA	NA	0.54 U	0.5 U	0.5 U	NA	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0472 U	0.0495 U	NA	NA	NA	NA		
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	NA	NA	NA	NA	0.54 U	0.5 U	0.5 U	NA	0.54 U	NA	0.5 U	0.5 U	0.5 UJ	0.5 U	0.1 U	0.0943 U	0.099 U	NA	NA	NA	NA	
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0472 U	0.0495 U	NA	NA	NA	NA		
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	2.5 U	2.5 U	2.5 U	2.55 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	2.7 U	0.5 U	0.22 J	0.21 J	0.189 U	0.685 UJ	NA	NA	NA	NA	
CHRYSENE	µg/L	1.5	TACO	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.5 U	0.052 J	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0943 U	0.099 U	NA	NA	NA	NA	
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	NA	NA	NA	NA	0.54 U	0.5 U	0.5 U	NA	0.54 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0472 U	0.099 U	NA	NA	NA	NA	
FLUORANTHENE	µg/L	280	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.02 J	0.042 J	0.022 J	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0943 U	0.099 U	NA	NA	NA	NA		
FLUORENE	µg/L	280	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0943 U	0.099 U	NA	NA	NA	NA		
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0943 U	0.099 U	NA	NA	NA	NA		
NAPHTHALENE	µg/L	140	TACO/620	0.0526 U	0.0583	0.0526 U	0.0532 U	0.065 J	0.5 U	0.03 J	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.051 J	0.5 U	0.05 U	0.0943 U	0.099 U	NA	NA	NA	NA	
PHENANTHRENE	µg/L	210	Non-TACO	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.5 U	0.021 J	0.54 U	0.5 U	0.5 U	0.5 U	0.051 J	0.031 J	0.0943 U	0.198 U	NA	NA	NA	NA		
PYRENE	µg/L	210	TACO/620	0.0526 U	0.0526 U	0.0526 U	0.0532 U	0.54 U	0.5 U	0.5 U	0.052 J	0.54 U	0.5 U	0.5 U	0.5 U	0.041 J	0.5 U	0.5 U	0.0943 U	0.099 U	NA	NA	NA	NA	
Herbicides:																									
MCPA	µg/L	3.5	Non-TACO	100 U	100 U	100 U	50 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	21 J	62 U	49 UJ	49 U	NA	NA	NA	NA	
MCPP	µg/L	7	620	100 U	100 U	100 U	50 U	200 U	200 U	200 U	200 U	200 UJ	200 U	31 J	200 U	200 U	45 J	31 U	49 U	49 UJ	NA	NA	NA	NA	
Dissolved Metals:																									
ALUMINUM	µg/L	3500	Non-TACO	NA	NA	NA	NA	NA	NA	26	NA	NA	24 U	NA	23 U	NA	100 U	13 U	NA	14.5 J	NA	NA	NA	NA	
ANTIMONY	µg/L	6	TACO/620	NA	NA	NA	NA	NA	NA	0.41	NA	NA	0.4 U	NA	0.36 U	NA	1 U	0.15 U	NA	2 U	NA	NA	NA	NA	
ARSENIC	µg/L	10	620	NA	NA	NA	NA	NA	NA	0.64	NA	NA	0.39 U	NA	0.77 J	NA	0.56 J	1.1	NA	1.5 U	NA	NA	NA	NA	
BARIUM	µg/L	2000	TACO/620	NA	NA	NA	NA	NA	NA	47	NA	NA	47	NA	59	NA	24	32	NA	66.5	NA	NA	NA	NA	
BERYLLIUM	µg/L	4	TACO/620	NA	NA	NA	NA	NA	NA	1 U	NA	NA	0.31 U	NA	0.3 U	NA	1 U	0.11 U	NA	0.5 U	NA	NA	NA	NA	
CADMIUM	µg/L	5	TACO/620	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	0.06 U	NA	0.055 U	NA	0.2 U	0.038 U	NA	0.5 U	NA	NA	NA	NA	
CALCIUM	µg/L	--	--	NA	NA	NA	NA	NA	NA	170000	NA	NA	140000 J	NA	150000 J	NA	210000	230000	NA	117000	NA	NA	NA	NA	
CHROMIUM, TOTAL	µg/L	100	TACO/620	NA	NA	NA	NA	NA	NA	1 U	NA	NA	0.75 U	NA	0.82 U	NA	1 U	0.2 U	NA	1 U	NA	NA	NA	NA	
COBALT	µg/L	1000	TACO/620	NA	NA	NA	NA	NA	NA	1.1	NA	NA	0.74	NA	0.95 J	NA	1.6	2.7	NA	2.5 U	NA	NA	NA	NA	
COPPER	µg/L	650	TACO/620	NA	NA	NA	NA	NA	NA	0.83	NA	NA	1.1	NA	1.1	NA	0.63 J	0.53 J	NA	1.11 J	NA	NA	NA	NA	
IRON	µg/L	5000	TACO/620	NA	NA	NA	NA	NA	NA	740	NA	NA	920	NA	730	NA	280	520	NA	641	NA	NA	NA	NA	
LEAD	µg/L	7.5	TACO/620	NA	NA	NA	NA	NA	NA	1 U	NA	NA	0.26 U	NA	0.22 U	NA	1 U	0.15 U	NA	0.749 J	NA	NA	NA	NA	
MAGNESIUM	µg/L	--	--	NA	NA	NA	NA	NA	NA	83000	NA	NA	74000 J	NA	82000 J	NA	85000	100000	NA	67600	NA	NA	NA	NA	
MANGANESE	µg/L	150	TACO/620	NA	NA	NA	NA	NA	NA	150	NA	NA	100	NA	200	NA	120	520	NA	90.3	NA	NA	NA	NA	
MERCURY	µg/L	2	TACO/620	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	0.061 U	NA	0.2 U	0.055 U	NA	0.16 UJ	NA	NA	NA	NA	
NICKEL	µg/L	100	TACO/620	NA	NA	NA	NA	NA	NA	2.9	NA	NA	1.4	NA	2.6	NA	3.8	6.9	NA	0.842 J	NA	NA	NA	NA	
POTASSIUM	µg/L	--	--	NA	NA	NA	NA	NA	NA	1400	NA	NA	1100	NA	1300 J	NA	550	480	NA	1540	NA	NA	NA	NA	
SELENIUM	µg/L	50	TACO/620	NA	NA	NA	NA	NA	NA	1 U	NA	NA	0.4 U	NA	0.88 J	NA	1 UJ	0.73 U	NA	1.25 U	NA	NA	NA	NA	
SILVER	µg/L	50	TACO/620	NA	NA	NA	NA	NA	NA	0.2 UJ	NA	NA	0.053 U	NA	0.061 U	NA	0.2 U	0.037 U	NA	0.5 UJ	NA	NA	NA	NA	
SODIUM	µg/L	--	--	NA	NA	NA	NA	NA	NA	33000	NA	NA	33000 J	NA	35000 J	NA	21000	26000	NA	33800	NA	NA	NA	NA	
THALLIUM	µg/L	2	TACO/620	NA	NA	NA	NA	NA	NA	1 U	NA	NA	0.05 U	NA	0.056 U	NA	1 U	0.047 J	NA	1 U	NA	NA	NA	NA	
VANADIUM	µg/L	49	TACO/620	NA	NA	NA	NA	NA	NA	0.35	NA	NA	0.87 U	NA	0.37 J	NA	0.16 J	0.2 J	NA	2.5 U	NA	NA	NA	NA	
ZINC	µg/L	5000	TACO/620	NA	NA	NA	NA	NA	NA	20 U	NA	NA	2 U	NA	7.2 J	NA	20 U	6.7 U	NA	2.5 UJ	NA	NA	NA	NA	
Miscellaneous Parameters:																									
AMMONIA	mg/L as N	30	SMCL	0.437	0.229	0.24	0.4	0.28	0.19	0.17	0.42	0.22	0.2	0.16 J	0.2	0.4	0.068	0.018 J	0.231 J	0.232 J	NA	NA	NA	NA	
CHLORIDE	mg/L	200	TACO/620	3	10.3	10.7	1.82 J	4.7	21	18	14 J	24	17	24	20	17 J	20	24	11.1 J	9.50	NA	NA	NA	NA	
NITRATE	mg/L as N	10	TACO/620	0.025 U	NA	NA	NA	0.1 U	0.1 U	0.034 J	0.02 U	0.1 U	0.016 U	0.1 U	0.05 U	0.05 U	0.0036 UJ	NA	0.1 U	NA	NA	NA	NA	NA	
SULFATE	mg/L	400	TACO/620	24.1	278	254	60.8	89	370	340	92 J	460	280	390	320	110	390	420	226	228	NA	NA	NA	NA	
TOTAL DISSOLVED SOLIDS	mg/L	500	SMCL	874	788	802	402	450	1000	950	440	1100	850	1100	860	478	11								

Appendix B - Table 6  
Historical Groundwater Results for Long Term Monitoring  
Site 3 Supplyside Landfill, Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 5	Round 6	Round 7	Round 8	Round 9	Round 10	Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8			
		Screening Value	Source	SL-02	SL-02	SL-02	SL-02	SL-02	SL-02	SL-02	SL-02	SL-02	SL-02	SL-02	SL-02	SL-02	SL-03	SL-03	SL-03	SL-03	SL-03	SL-03	SL-03	SL-03			
				11/16/2007	2/28/2008	5/6/2008	8/18/2008	11/18/2008	5/20/2009	11/19/2009	5/3/2010	11/15/2010	5/16/2011	5/1/2012	5/13/2013	5/21/2014	8/2/2006	1/24/2007	5/1/2007	8/1/2007	11/15/2007	3/4/2008	5/6/2008	8/19/2008			
				NTC03GW0205	NTC03GW0206	NTC03GW0207	NTC03GW0208	NTC03GW0209	NTC03GW0210	NTC03GW0211	NTC03GW0212	NTC03GW0213	NTC03GW0214	NTC03GW0215	SSL-02-20130513	SSL-02-20140521	SL-03_20060802	SL-03_20070124	SL-03_20070501	SL-03_20070801	NTC03GW0305	NTC03GW0306	NTC03GW0307	NTC03GW0308			
Semivolatile Organic Compounds:																											
ACENAPHTHENE	µg/L	420	TACO/620	5 U	0.54 U	0.021 J	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.1 U	0.1 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.019 J	0.5 U			
ACENAPHTHYLENE	µg/L	210	Non-TACO	5 U	0.54 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.1 U	0.1 U	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	NA			
ANTHRACENE	µg/L	2100	TACO/620	5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.041 J	0.032 J	0.1 U	0.1 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U			
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.092 J	0.1 U	0.05 U	0.05 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.051 J			
BENZO[A]PYRENE	µg/L	0.2	TACO/620	5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.041 J	0.1 U	0.05 U	0.05 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U			
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	5 U	0.54 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.1 U	0.05 U	0.05 U	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	NA			
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	5 U	0.54 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 UJ	0.5 U	0.1 U	0.1 U	0.1 U	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	NA			
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.051 J	0.1 U	0.05 U	0.05 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.061 J			
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	5 U	0.54 U	2.1	0.5 U	0.5 U	0.54 U	0.5 U	1.5 U	0.33 J	0.5 U	0.29 J	0.2 U	0.667 UJ	2.5 U	2.5 U	2.5 U	2.58 U	0.5 U	0.5 U	2.5	0.5 U			
CHRYSENE	µg/L	1.5	TACO	5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.071 J	0.1 U	0.1 U	0.1 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.051 J			
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	5 U	0.54 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.05 U	0.1 U	0.05 U	0.1 U	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	NA			
FLUORANTHENE	µg/L	280	TACO/620	5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.042 J	0.051 J	0.05 U	0.1 U	0.1 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.03 J			
FLUORENE	µg/L	280	TACO/620	5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.1 U	0.1 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U			
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.032 J	0.1 U	0.1 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.5 U			
NAPHTHALENE	µg/L	140	TACO/620	5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.1 U	0.1 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.049 J	0.5 U	0.5 U	0.5 U			
PHENANTHRENE	µg/L	210	Non-TACO	10 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.032 J	0.041 J	0.032 J	0.1 U	0.2 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.02 J			
PYRENE	µg/L	210	TACO/620	5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.03 J	0.042 J	0.071 J	0.1 U	0.1 U	0.0526 U	0.0526 U	0.0526 U	0.051 U	0.5 U	0.5 U	0.5 U	0.03 J			
Herbicides:																											
MCPA	µg/L	3.5	Non-TACO	200 U	200 UJ	200 U	200 U	210 U	200 U	240 U	200 U	200 U	200 U	69 U	49.5 U	49 U	100 U	100 U	100 U	52.4 U	200 U	200 UJ	200 U	200 U			
MCPP	µg/L	7	620	200 U	200 UJ	200 U	200 U	210 UJ	200 U	85 J	200 U	200 U	200 U	35 U	49.5 U	49 UJ	100 U	100 U	100 U	52.4 U	200 U	200 UJ	200 U	200 U			
Dissolved Metals:																											
ALUMINUM	µg/L	3500	Non-TACO	44 U	2200	NA	NA	NA	NA	NA	NA	28 U	NA	13 U	NA	28.7 J	NA	NA	NA	NA	44 U	82	46	100 U			
ANTIMONY	µg/L	6	TACO/620	0.86 U	1 U	NA	NA	NA	NA	NA	NA	0.36 U	NA	0.15 U	NA	2 U	NA	NA	NA	NA	0.44 U	1 U	0.55	1 U			
ARSENIC	µg/L	10	620	5.4	4.7	NA	NA	NA	NA	NA	NA	1 J	NA	1.5	NA	2.90	NA	NA	NA	NA	2.8	1.8	1.6	1.5 J			
BARIUM	µg/L	2000	TACO/620	54	64	NA	NA	NA	NA	NA	NA	43	NA	62	NA	39.2	NA	NA	NA	NA	19	18	18	16			
BERYLLIUM	µg/L	4	TACO/620	0.31 U	1 U	NA	NA	NA	NA	NA	NA	0.3 U	NA	0.11 U	NA	0.5 U	NA	NA	NA	NA	0.31 U	1 U	1 U	NA			
CADMIUM	µg/L	5	TACO/620	0.062 U	0.2 U	NA	NA	NA	NA	NA	NA	0.055 U	NA	0.038 U	NA	0.5 U	NA	NA	NA	NA	0.062 U	0.2 U	0.2 U	0.2 U			
CALCIUM	µg/L	--	--	62000 J	58000	NA	NA	NA	NA	NA	NA	52000 J	NA	58000	NA	47500	NA	NA	NA	NA	76000 J	82000	80000	72000			
CHROMIUM, TOTAL	µg/L	100	TACO/620	2.5	1 U	NA	NA	NA	NA	NA	NA	0.87 U	NA	0.2 U	NA	1 U	NA	NA	NA	NA	1.4	1 U	0.99	1 UJ			
COBALT	µg/L	1000	TACO/620	0.42	0.93	NA	NA	NA	NA	NA	NA	0.089 J	NA	0.23 J	NA	2.5 U	NA	NA	NA	NA	0.14	0.15	0.21	0.056 J			
COPPER	µg/L	650	TACO/620	0.68	2.3 J	NA	NA	NA	NA	NA	NA	0.71 U	NA	0.74 J	NA	1.27 J	NA	NA	NA	NA	0.68	0.48 J	0.76	0.79 UJ			
IRON	µg/L	5000	TACO/620	5.7 U	2100	NA	NA	NA	NA	NA	NA	150	NA	110	NA	123	NA	NA	NA	NA	620	890	710	670			
LEAD	µg/L	7.5	TACO/620	0.33 U	1.9	NA	NA	NA	NA	NA	NA	0.22 U	NA	0.15 U	NA	0.75 U	NA	NA	NA	NA	0.33 U	1 U	1 U	1 U			
MAGNESIUM	µg/L	--	--	87000 J	90000	NA	NA	NA	NA	NA	NA	82000	NA	37000	NA	28100	NA	NA	NA	NA	77000 J	77000	75000	69000			
MANGANESE	µg/L	150	TACO/620	29	49	NA	NA	NA	NA	NA	NA	18	NA	10	NA	27.2	NA	NA	NA	NA	20	28	27	22			
MERCURY	µg/L	2	TACO/620	0.074 U	0.2 U	NA	NA	NA	NA	NA	NA	0.061 U	NA	0.055 U	NA	0.16 U	NA	NA	NA	NA	0.046 U	0.2 U	0.2 U	NA			
NICKEL	µg/L	100	TACO/620	2.8	4.4 J	NA	NA	NA	NA	NA	NA	2	NA	2.2	NA	2.25 J	NA	NA	NA	NA	1.9	0.71	2.2	0.98 J			
POTASSIUM	µg/L	--	--	3400	3900	NA	NA	NA	NA	NA	NA	3100	NA	6500	NA	9110	NA	NA	NA	NA	2400	2600	2500	2100			
SELENIUM	µg/L	50	TACO/620	1	1 U	NA	NA	NA	NA	NA	NA	0.9 J	NA	0.31 U	NA	1.25 U	NA	NA	NA	NA	0.92 U	1 U	1 U	1 U			
SILVER	µg/L	50	TACO/620	0.12 U	0.2 U	NA	NA	NA	NA	NA	NA	0.11 J	NA	0.037 U	NA	0.5 UJ	NA	NA	NA	NA	0.12 U	0.2 U	0.2 UJ	0.2 U			
SODIUM	µg/L	--	--	260000 J	270000	NA	NA	NA	NA	NA	NA	250000	NA	380000	NA	352000	NA	NA	NA	NA	56000 J	52000	51000	47000			
THALLIUM	µg/L	2	TACO/620	0.35	1 U	NA	NA	NA	NA	NA	NA	0.056 U	NA	0.027 U	NA	1 U	NA	NA	NA	NA	0.17 U	1 U	1 U	1 U			
VANADIUM	µg/L	49	TACO/620	0.83 U	2.7	NA	NA	NA	NA	NA	NA	0.28 U	NA	0.51 J	NA	2.5 U	NA	NA	NA	NA	1.6	3 U	0.35	3 U			
ZINC	µg/L	5000	TACO/620	5.6	20 U	NA	NA	NA	NA	NA	NA	11 J	NA	36	NA	2.5 UJ	NA	NA	NA	NA	15	8.7 J	20 U	3.6 UJ			
Miscellaneous Parameters:																											
AMMONIA	mg/L as N	30	SMCL	0.3	0.36	0.35	0.36	0.33	0.32	0.33 J	0.25	0.3	0.32	0.17	0.313	0.228 J	0.544	0.341	0.538	0.48	0.38	0.6	0.56	0.49			
CHLORIDE	mg/L	200	TACO/620	580	580	590	580 J	560	590	420	420	500 J	570	600	1140	449	38	34.5	30	26.6	10	28	28	34 J			
NITRATE	mg/L as N	10	TACO/620	0.17	0.04																						

Appendix B - Table 6  
Historical Groundwater Results for Long Term Monitoring  
Site 3 Suppliside Landfill, Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 9	Round 9	Round 10	Round 11	Round 12	Round 13	Round 14	Round 14	Round 15	Round 16	Round 17	Round 1	Round 2	Round 2	Round 3	Round 3	Round 4	Round 4	Round 5	Round 5	Round 6	
		Screening Value	Source	SL-03	SL-03	SL-03	SL-03	SL-03	SL-03	SL-03	SL-03	SL-03	SL-03	SL-03	SL-03	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	
				11/18/2008	11/18/2008	5/20/2009	11/18/2009	5/4/2010	11/16/2010	5/17/2011	5/17/2011	5/17/2011	5/1/2012	5/14/2013	5/20/2014	8/14/2006	1/25/2007	1/25/2007	5/3/2007	5/3/2007	5/3/2007	8/21/2007	8/21/2007	11/15/2007	11/15/2007
Semivolatile Organic Compounds:																									
ACENAPHTHENE	µg/L	420	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.021 J	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.5 U	0.019 J	0.5 U	
ACENAPHTHYLENE	µg/L	210	Non-TACO	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0962 U	0.5 U	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	
ANTHRACENE	µg/L	2100	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.5 U	0.5 U	0.5 U	
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0258 J	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.5 U	0.5 U	0.5 U	
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.5 U	0.5 U	0.5 U	0.05 J	0.5 U	0.5 U	0.5 U	0.5 U	0.07 J	0.0463 U	0.0481 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.5 U	0.5 U	0.5 U	
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0481 U	0.5 U	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	
BENZO[G,H]PERYLENE	µg/L	210	Non-TACO	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0926 U	0.0962 U	0.5 U	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0481 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.5 U	0.5 U	0.5 U	
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	3.6 U	0.27 J	0.5 U	0.22 J	0.23 J	0.185 U	0.679 UJ	2.5 U	2.5 U	2.66 U	2.5 U	2.63 U	2.72 U	2.84 U	0.5 U	0.5 U	0.5 U	
CHRYSENE	µg/L	1.5	TACO	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0926 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.029 J	0.5 U	0.5 U	
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0463 U	0.0962 U	0.5 U	NA	NA	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	
FLUORANTHENE	µg/L	280	TACO/620	0.5 U	0.5 U	0.5 U	0.04 J	0.5 U	0.5 U	0.5 U	0.5 U	0.02 J	0.0926 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.019 J	0.5 U	0.5 U	
FLUORENE	µg/L	280	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.5 U	0.5 U	0.5 U	
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.03 J	0.0926 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.5 U	0.5 U	0.5 U	
NAPHTHALENE	µg/L	140	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	0.0926 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.058 J	0.049 J	0.5 U	
PHENANTHRENE	µg/L	210	Non-TACO	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.03 J	0.0926 U	0.192 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.5 U	0.5 U	0.5 U	
PYRENE	µg/L	210	TACO/620	0.5 U	0.5 U	0.5 U	0.04 J	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.0926 U	0.0962 U	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0535 U	0.051 U	0.0532 U	0.5 U	0.5 U	0.5 U	
Herbicides:																									
MCPA	µg/L	3.5	Non-TACO	200 U	200 U	200 U	240 U	200 U	88 J	200 U	200 U	230	47.6 UJ	32.2 J	100 U	100 U	52.1 U	100 U	54.3 U	54.9 U	53.8 U	200 U	200 U	200 UJ	
MCPP	µg/L	7	620	200 UJ	200 UJ	200 U	240 U	200 U	160 NJ	54 NJ	200 U	1200	47.6 U	49 UJ	100 U	100 U	52.1 U	100 U	54.3 U	54.9 U	53.8 U	200 U	200 U	200 UJ	
Dissolved Metals:																									
ALUMINUM	µg/L	3500	Non-TACO	100 U	100 U	24 U	100 U	23 U	28 U	100 U	100 U	13 U	NA	26.3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
ANTIMONY	µg/L	6	TACO/620	1 U	1 U	0.58	1 U	0.36 U	0.36 U	1 U	1 U	0.15 U	NA	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
ARSENIC	µg/L	10	620	2.1	1.8	1.3	0.98	1 J	0.38 U	0.65 J	0.77 J	0.37 J	NA	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BARIUM	µg/L	2000	TACO/620	17	16	20	20	23	18	18	17	25	NA	21.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
BERYLLIUM	µg/L	4	TACO/620	1 U	1 U	0.31 U	1 U	0.3 U	0.3 U	1 U	1 U	0.11 U	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
CADMIUM	µg/L	5	TACO/620	0.068	0.061	0.06 U	0.2 U	0.055 U	0.055 U	0.2 U	0.2 U	0.038 U	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
CALCIUM	µg/L	--	--	79000 J	78000 J	92000 J	77000	92000 J	88000 J	88000	88000	110000	NA	78300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
CHROMIUM, TOTAL	µg/L	100	TACO/620	1 U	1 U	0.9 U	0.73	0.47 U	0.81 U	1 U	1 U	0.2 U	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
COBALT	µg/L	1000	TACO/620	0.14	0.13	0.31	0.14	0.16 J	0.14 J	1 U	1 U	0.061 J	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
COPPER	µg/L	650	TACO/620	0.98	0.85	1.6	0.92	0.9 J	0.73 J	0.15 J	1 U	0.52 J	NA	2 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
IRON	µg/L	5000	TACO/620	610	610	890	670	520	220	54	51	73	NA	10.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
LEAD	µg/L	7.5	TACO/620	1 U	1 U	0.26 U	1 U	0.22 U	0.22 U	1 U	1 U	0.15 U	NA	0.417 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
MAGNESIUM	µg/L	--	--	74000 J	74000 J	77000 J	71000	75000 J	87000	78000	78000	83000	NA	83200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
MANGANESE	µg/L	150	TACO/620	23	23	50	48	110	45	42	43	94	NA	13.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
MERCURY	µg/L	2	TACO/620	0.2 U	0.2 U	NA	0.2 U	0.061 U	0.061 U	0.2 U	0.2 U	0.055 U	NA	0.16 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
NICKEL	µg/L	100	TACO/620	1.6	1.3	3	1.4	1.5	1.9	1 U	1 U	1.5	NA	1.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
POTASSIUM	µg/L	--	--	2500	2400	2700	2400	2300	2500	2200	2100	2300	NA	2540	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
SELENIUM	µg/L	50	TACO/620	1 U	1 U	0.4 U	1 U	0.82 U	0.82 U	1 UJ	1 UJ	0.37 U	NA	1.25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
SILVER	µg/L	50	TACO/620	0.67	0.48	0.087	0.2 U	0.073 J	0.069 U	0.2 U	0.2 U	0.037 U	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
SODIUM	µg/L	--	--	52000 J	52000 J	56000 J	42000	46000 J	58000	47000	46000	45000	NA	50400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
THALLIUM	µg/L	2	TACO/620	1 U	1 U	0.05 U	1 U	0.056 U	0.094 J	1 U	1 U	0.027 U	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
VANADIUM	µg/L	49	TACO/620	3.6	3.2	1.1 U	3 U	0.28 U	0.29 J	0.14 J	0.11 J	0.27 J	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
ZINC	µg/L	5000	TACO/620	2.7	1.9	220	20 U	9.1 J	2.9 U	20 U	7.3 J	15 U	NA	2.5 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Miscellaneous Parameters:																									
AMMONIA	mg/L as N	30	SMCL	0.52	0.51	0.5	0.48 J	0.38	0.34	0.33	0.35	0.24	0.499	0.331	0.326	0.333	0.273	0.277	0.271	0.289	0.273	0.17	0.15	0.17	
CHLORIDE	mg/L	200	TACO/620	30	40	26	32	27	23 J	27	27	26	32.0	20.9	td										

Appendix B - Table 6  
Historical Groundwater Results for Long Term Monitoring  
Site 3 Suppliside Landfill, Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 7	Round 7	Round 8	Round 9	Round 10	Round 10	Round 11	Round 12	Round 13	Round 14	Round 15	Round 15	Round 16	Round 17	Round 17	Round 1	Round 1	Round 2	Round 3	Round 4	Round 5	
		Screening Value	Source	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-04	SL-05	SL-05	SL-05	SL-05	SL-05	SL-05	
				5/5/2008	5/5/2008	8/19/2008	11/19/2008	5/20/2009	5/20/2009	11/17/2009	5/4/2010	11/16/2010	5/17/2011	5/1/2012	5/1/2012	5/14/2013	5/20/2014	5/20/2014	5/20/2014	8/9/2006	8/9/2006	1/23/2007	5/2/2007	8/2/2007	11/15/2007
				NTC03GW0407	NTC03GW0407-D	NTC03GW0408	NTC03GW0409	NTC03GW0410	NTC03GW0410-D	NTC03GW0411	NTC03GW0412	NTC03GW0413	NTC03GW0414	NTC03GW0415	NTC03GW0415-D	SSL-04-20130514	SSL-04-20140520	DUP2-20140520	SL-05_20060809	SL-05_20060809-D	SL-05_20070123	SL-05_20070502	SL-05_20070802	NTC03GW0505	
Semivolatile Organic Compounds:																									
ACENAPHTHENE	µg/L	420	TACO/620	0.5 U	0.02 J	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.05 U	0.054 U	0.0943 U	0.0962 U	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
ACENAPHTHYLENE	µg/L	210	Non-TACO	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.05 U	0.054 U	0.0943 U	0.0962 U	NA	NA	NA	NA	NA	NA	0.54 U	
ANTHRACENE	µg/L	2100	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.05 U	0.054 U	0.0943 U	0.0962 U	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.5 U	0.5 U	0.5 U	0.031 J	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.041 J	0.1 U	0.11 U	0.0472 U	0.0516 J	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.041 J	0.11 U	0.11 U	0.0472 U	0.0288 J	NA	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.1 U	0.11 U	0.0472 U	0.0654 J	NA	NA	NA	NA	NA	NA	0.54 U	
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.54 U	0.5 U	0.5 UJ	0.5 U	0.1 U	0.11 U	0.0943 U	0.0962 U	NA	NA	NA	NA	NA	NA	0.54 U	
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.1 U	0.11 U	0.0472 U	0.0397 J	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	9.8 U	0.5 U	0.2 J	0.27 J	0.86	0.189 U	0.758 U	NA	2.5 U	2.75 U	2.5 U	2.5 U	2.55 U	0.54 U	
CHRYSENE	µg/L	1.5	TACO	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.1 U	0.11 U	0.0943 U	0.0962 U	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.1 U	0.11 U	0.0472 U	0.0962 U	NA	NA	NA	NA	NA	NA	0.54 U	
FLUORANTHENE	µg/L	280	TACO/620	0.5 U	0.5 U	0.5 U	0.021 J	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.02 J	0.022 J	0.0943 U	0.0562 J	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
FLUORENE	µg/L	280	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.05 U	0.054 U	0.0943 U	0.0962 U	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.1 U	0.033 J	0.0943 U	0.0488 J	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
NAPHTHALENE	µg/L	140	TACO/620	0.029 J	0.03 J	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.05 U	0.054 U	0.0943 U	0.0962 U	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.043 J	
PHENANTHRENE	µg/L	210	Non-TACO	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.031 J	0.033 J	0.0943 U	0.192 U	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
PYRENE	µg/L	210	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.5 U	0.5 U	0.1 U	0.11 U	0.0943 U	0.0549 J	NA	0.0526 U	0.0526 U	0.0526 U	0.0526 U	0.0482 U	0.54 U	
Herbicides:																									
MCPA	µg/L	3.5	Non-TACO	200 U	200 UJ	200 U	220 U	200 U	200 U	200 U	200 U	200 U	200 U	62 U	62 U	47.6 UJ	30.6 J	48.1 U	100 U	104 U	100 U	100 U	100 U	200 U	
MCPP	µg/L	7	620	200 U	200 UJ	200 U	220 UJ	200 U	200 U	200 U	200 U	200 U	200 U	31 U	31 U	47.2 UJ	47.2 UJ	48.1 UJ	100 U	104 U	100 U	100 U	100 U	200 U	
Dissolved Metals:																									
ALUMINIUM	µg/L	3500	Non-TACO	NA	NA	NA	26	NA	NA	NA	NA	NA	NA	13 U	13 U	NA	31.6 J	NA	NA	NA	NA	NA	NA	NA	
ANTIMONY	µg/L	6	TACO/620	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	NA	2 U	NA	NA	NA	NA	NA	NA	NA	
ARSENIC	µg/L	10	620	NA	NA	NA	0.43	NA	NA	NA	NA	NA	NA	0.25 J	0.28 J	NA	1.5 U	NA	NA	NA	NA	NA	NA	NA	
BARIUM	µg/L	2000	TACO/620	NA	NA	NA	67	NA	NA	NA	NA	NA	NA	71	75	NA	70.9	NA	NA	NA	NA	NA	NA	NA	
BERYLLIUM	µg/L	4	TACO/620	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	0.11 U	0.11 U	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	
CADMIUM	µg/L	5	TACO/620	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	0.038 U	0.038 U	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	
CALCIUM	µg/L	--	--	NA	NA	NA	88000 J	NA	NA	NA	NA	NA	NA	76000	78000	NA	70200	NA	NA	NA	NA	NA	NA	NA	
CHROMIUM, TOTAL	µg/L	100	TACO/620	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U	NA	1 U	NA	NA	NA	NA	NA	NA	NA	
COBALT	µg/L	1000	TACO/620	NA	NA	NA	0.78	NA	NA	NA	NA	NA	NA	0.31 J	0.34 J	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	
COPPER	µg/L	650	TACO/620	NA	NA	NA	2.1	NA	NA	NA	NA	NA	NA	0.9 J	1.5 J	NA	1.24 J	NA	NA	NA	NA	NA	NA	NA	
IRON	µg/L	5000	TACO/620	NA	NA	NA	38	NA	NA	NA	NA	NA	NA	300	330	NA	454	NA	NA	NA	NA	NA	NA	NA	
LEAD	µg/L	7.5	TACO/620	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	NA	0.449 J	NA	NA	NA	NA	NA	NA	NA	
MAGNESIUM	µg/L	--	--	NA	NA	NA	56000 J	NA	NA	NA	NA	NA	NA	54000	56000	NA	53100	NA	NA	NA	NA	NA	NA	NA	
MANGANESE	µg/L	150	TACO/620	NA	NA	NA	31	NA	NA	NA	NA	NA	NA	13	15	NA	13.9	NA	NA	NA	NA	NA	NA	NA	
MERCURY	µg/L	2	TACO/620	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	0.055 U	0.055 U	NA	0.16 UJ	NA	NA	NA	NA	NA	NA	NA	
NICKEL	µg/L	100	TACO/620	NA	NA	NA	3.6	NA	NA	NA	NA	NA	NA	1.9	2 J	NA	0.920 J	NA	NA	NA	NA	NA	NA	NA	
POTASSIUM	µg/L	--	--	NA	NA	NA	2100	NA	NA	NA	NA	NA	NA	1800	1900	NA	1930	NA	NA	NA	NA	NA	NA	NA	
SELENIUM	µg/L	50	TACO/620	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	0.31 U	0.31 U	NA	1.25 U	NA	NA	NA	NA	NA	NA	NA	
SILVER	µg/L	50	TACO/620	NA	NA	NA	0.36	NA	NA	NA	NA	NA	NA	0.037 U	0.037 U	NA	0.5 UJ	NA	NA	NA	NA	NA	NA	NA	
SODIUM	µg/L	--	--	NA	NA	NA	40000 J	NA	NA	NA	NA	NA	NA	31000	32000	NA	30400	NA	NA	NA	NA	NA	NA	NA	
THALLIUM	µg/L	2	TACO/620	NA	NA	NA	0.079	NA	NA	NA	NA	NA	NA	0.051 J	0.053 J	NA	1 U	NA	NA	NA	NA	NA	NA	NA	
VANADIUM	µg/L	49	TACO/620	NA	NA	NA	4.1	NA	NA	NA	NA	NA	NA	0.066 U	0.066 U	NA	2.5 U	NA	NA	NA	NA	NA	NA	NA	
ZINC	µg/L	5000	TACO/620	NA	NA	NA	2.9	NA	NA	NA	NA	NA	NA	91 J	14 U	NA	1.37 J	NA	NA	NA	NA	NA	NA	NA	
Miscellaneous Parameters:																									
AMMONIA	mg/L as N	30	SMCL	0.18	0.17	0.2	0.16	0.15	0.14	0.081 J	0.16	0.16	0.16	0.23	0.21	0.297 J	0.205 J	NA	16.7	19.5	13.9	22.5	16.3	16 J	
CHLORIDE	mg/L	200	TACO/620	23	19	22 J	23	22	23	31	18	17 J	17	16	15	12.4 J	13.5	NA	146	151	149	159	169	180	
NITRATE	mg/L as N	10	TACO/620	0.26	0.31	0.19	0.43	0.48	0.35	0.95	0.31	0.13	0.4	0.22	0.2	NA	0.195 J	NA	NA	NA	NA	NA	0.1 U		



Appendix B - Table 6  
Historical Groundwater Results for Long Term Monitoring  
Site 3 Suppliside Landfill, Naval Station Great Lakes, Illinois

Analyte	Units	Criteria		Round 6 SL-06 2/28/2008	Round 7 SL-06 5/6/2008	Round 8 SL-06 8/19/2008	Round 9 SL-06 11/20/2008	Round 10 SL-06 5/21/2009	Round 11 SL-06 11/18/2009	Round 11 SL-06 11/18/2009	Round 12 SL-06 5/4/2010	Round 13 SL-06 11/16/2010	Round 14 SL-06 5/17/2011	Round 15 SL-06 5/1/2012	Round 16 SL-06 5/14/2013	Round 17 SL-06 5/21/2014
		Screening Value	Source	NTC03GW0606-D FD	NTC03GW0607 N	NTC03GW0608 N	NTC03GW0609 N	NTC03GW0610 N	NTC03GW0611 N	NTC03GW0611-D FD	NTC03GW0612 N	NTC03GW0613 N	NTC03GW0614 N	NTC03GW0615 N	SSL-06-20130514 N	SSL-06-20140521 N
Semivolatile Organic Compounds:																
ACENAPHTHENE	µg/L	420	TACO/620	0.5 U	0.019 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.05 U	0.098 U	0.0962 U
ACENAPHTHYLENE	µg/L	210	Non-TACO	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.05 U	0.098 U	0.0962 U
ANTHRACENE	µg/L	2100	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.052 J	0.05 U	0.098 U	0.0962 U
BENZO[A]ANTHRACENE	µg/L	0.13	TACO/620	0.5 U	0.5 U	0.5 U	0.042 J	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.093 J	0.1 U	0.49 U	0.0481 U
BENZO[A]PYRENE	µg/L	0.2	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.062 J	0.1 U	0.49 U	0.0481 U
BENZO[B]FLUORANTHENE	µg/L	0.18	TACO/620	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.1 U	0.49 U	0.0481 U
BENZO[G,H,I]PERYLENE	µg/L	210	Non-TACO	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.54 UJ	0.5 U	0.1 U	0.098 U	0.0962 U
BENZO[K]FLUORANTHENE	µg/L	0.17	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.052 J	0.1 U	0.49 U	0.0481 U
BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2 U	0.28 J	0.2 J	0.5 U	0.196 U	0.707 UJ
CHRYSENE	µg/L	1.5	TACO	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.093 J	0.1 U	0.098 U	0.0962 U
DIBENZ[A,H]ANTHRACENE	µg/L	0.3	TACO/620	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.1 U	0.49 U	0.0962 U
FLUORANTHENE	µg/L	280	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.082 J	0.05 U	0.098 U	0.0962 U
FLUORENE	µg/L	280	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.11 J	0.098 U	0.0962 U
INDENO[1,2,3-CD]PYRENE	µg/L	0.43	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.1 U	0.098 U	0.0962 U
NAPHTHALENE	µg/L	140	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.5 U	0.05 U	0.098 U	0.0962 U
PHENANTHRENE	µg/L	210	Non-TACO	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54 U	0.052 J	0.05 U	0.098 U	0.192 U
PYRENE	µg/L	210	TACO/620	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.032 J	0.082 J	0.1 U	0.098 U	0.0962 U
Herbicides:																
MCPA	µg/L	3.5	Non-TACO	200 UJ	200 U	200 U	200 U	200 U	220 U	200 U	200 U	200 U	200 U	62 U	48.1 UJ	46.3 U
MCPP	µg/L	7	620	200 U	200 U	200 U	200 U	200 U	220 U	110 R	200 U	200 U	200 U	31 U	48.1 U	46.3 UJ
Dissolved Metals:																
ALUMINUM	µg/L	3500	Non-TACO	100 U	27	100 U	100 U	24 U	100 U	100 U	23 U	28 U	100 U	13 U	NA	45.3 J
ANTIMONY	µg/L	6	TACO/620	1 U	1 U	0.52 UJ	1 U	0.42	1 U	1 U	0.58 J	0.64 U	1 U	0.31 U	NA	2 U
ARSENIC	µg/L	10	620	3.2	5.5	6.1	4.1	3.3	4.3	4.2	7	6.3	3.4	5.2	NA	4.46
BARIUM	µg/L	2000	TACO/620	50	51	56	50	52	56	56	66	49	55	61	NA	69.8
BERYLLIUM	µg/L	4	TACO/620	1 U	1 U	1 U	1 U	0.31 U	1 U	1 U	0.3 U	0.3 U	1 U	0.11 U	NA	0.5 U
CADMIUM	µg/L	5	TACO/620	0.2 U	0.2 U	0.2 U	0.2 U	0.06 U	0.2 U	0.2 U	0.055 U	0.055 U	0.2 U	0.038 U	NA	0.5 U
CALCIUM	µg/L	--	--	150000	160000	140000	140000 J	160000 J	140000	140000	160000 J	130000 J	150000	180000	NA	154000
CHROMIUM, TOTAL	µg/L	100	TACO/620	1 U	0.66	1 UJ	0.92	0.66 U	0.91	0.48	0.58 U	0.47 U	1 U	0.2 U	NA	1 U
COBALT	µg/L	1000	TACO/620	0.85	0.85	0.89 J	0.78	0.89	0.77	0.81	1.4	0.86 J	0.8 J	0.57 J	NA	2.5 U
COPPER	µg/L	650	TACO/620	1.2 J	0.88	0.94 UJ	0.93	1.5	0.87	0.88	1.2	0.97 J	0.64 J	0.55 J	NA	1.19 J
IRON	µg/L	5000	TACO/620	2900	6400	1300	3000 J	7100 J	5100	4800	2700	5800	3600	9800	NA	5020
LEAD	µg/L	7.5	TACO/620	1 U	1 U	1 U	1 U	0.26 U	1 U	1 U	0.22 U	0.22 U	1 U	0.15 U	NA	0.620 J
MAGNESIUM	µg/L	--	--	51000	55000	50000	49000 J	56000 J	52000	48000	58000 J	47000	55000	64000	NA	54100
MANGANESE	µg/L	150	TACO/620	730	760	490	590	740	620	620	760	430	580	750	NA	557
MERCURY	µg/L	2	TACO/620	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.061 U	0.061 U	0.2 U	0.055 U	NA	0.16 U
NICKEL	µg/L	100	TACO/620	4.1 J	2.1	3.3	2.6	2.6	2.5	2.4	3.8	3.3	2.5	2	NA	2.54 J
POTASSIUM	µg/L	--	--	1100 J	1100	1300	1200	920	1100	1100	1100 J	1200	890	980	NA	1210 J
SELENIUM	µg/L	50	TACO/620	1 U	1 U	0.4 UJ	1 U	0.4 U	1 U	1 U	0.82 U	0.82 U	1 U	0.31 U	NA	1.25 U
SILVER	µg/L	50	TACO/620	0.2 U	0.2 UJ	0.2 U	0.2 U	0.059 U	0.13	0.2 U	0.061 U	0.061 U	0.2 U	0.037 U	NA	0.5 UJ
SODIUM	µg/L	--	--	47000	50000	54000	61000 J	49000 J	51000	49000	55000 J	56000	58000	69000	NA	74200
THALLIUM	µg/L	2	TACO/620	1 U	1 U	1 U	1 U	0.05 U	1 U	1 U	0.056 U	0.071 J	1 U	0.027 U	NA	1 U
VANADIUM	µg/L	49	TACO/620	3 U	0.3	3 U	3.8	0.84 U	3 U	3 U	0.48 J	0.28 U	0.32 J	0.23 J	NA	2.5 U
ZINC	µg/L	5000	TACO/620	20 U	20 U	10 UJ	20 U	3.4	20 U	20 U	7.5 J	2.9 U	20 U	5.9 U	NA	11.4 J
Miscellaneous Parameters:																
AMMONIA	mg/L as N	30	SMCL	0.26	0.24	0.27	0.29	0.24	0.3 J	0.33 J	0.26	0.19	0.32	0.24	0.276 J	0.226 J
CHLORIDE	mg/L	200	TACO/620	99	78	130 J	130	77	110	110	110	140 J	120	130	160	159
NITRATE	mg/L as N	10	TACO/620	0.1 U	0.024 J	0.02 U	0.1 U	0.016 U	0.02	0.1 U	0.05 U	0.05 U	0.05 U	0.008 U	NA	0.1 U
SULFATE	mg/L	400	TACO/620	150	180	130 J	97	170	130	130	160	75	160	160	166	135
TOTAL DISSOLVED SOLIDS	mg/L	500	SMCL	800	790	790	760	850	810	790	760	762	890	980	889	817
TOTAL SUSPENDED SOLIDS	mg/L	--	--	75	72	87	83	56	42 J	42 J	100 J	630	56.8	186	86.0	212
Field Parameters:																
DISSOLVED OXYGEN	mg/L	--	--	NA	0.11	0.49	0.27	0.31	0.08	NA	1.5	NA	NA	NA	1.68	2.02
OXIDATION REDUCTION POTEN	mV	--	--	NA	-57	-33	-53	-44	-55	NA	-53	NA	NA	NA	-81	-18.1
PH	SU	6.5-8.5	SMCL	NA	6.93	6.83	7.38	6.82	6.45	NA	8.33	6.8 J	7.2 J	6.9 J	6.66	6.62
SPECIFIC CONDUCTANCE	mS/cm	--	--	NA	NA	1.242	NA	1.374	NA	NA	NA	NA	NA	NA	1.423	1.255
TEMPERATURE	°C	--	--	NA	11.82	14.64	12.62	11.68	12.7	NA	11.95	NA	NA	NA	10.9	11.79
TURBIDITY	NTU	--	--	NA	180	96.6	123	120	195	NA	216	NA	NA	NA	242	291

**Historical Groundwater Results for LTM Parameters  
Site 3 Supplyside Landfill  
Naval Station Great Lakes, IL**

Notes:

U - nondetect

J - estimated value

R - Rejected

UJ - estimated limit of detection (LOD)

Results exceeding screening are highlighted and in bold.

TACO = Illinois EPA Tiered Approach to Corrective Action Objectives, taken from Illinois Administrative Code 35, Chapter I, Section 742, Appendix B, Table E (IEPA 2007).

RSLs = USEPA Regions 3, 6, and 9 Regional Screen Level, (May 2013).

620 = Illinois EPA Class I Potable Resource Groundwater, taken from Illinois Administrative Code 35, Chapter I, Section 620, Subpart D (IEPA 2012).

If two sources of criteria are listed, the values are the same for the sources listed.

RSL-Tap: Regional Screening Level, Tapwater

TACO: Tiered Approach to Corrective Action Objectives, Soil Component of Groundwater Ingestion Exposure Route Class I

SMCL: USEPA Secondary Maximum Containment Level

Non-TACO: GRO not promulgated under 35 IAC 742

## **Appendix B**

### **Public Notice Certificate of Publication**

# Certificate of Publication

I, John Rung, do hereby certify that I am the publisher of the **Great Lakes Bulletin Journal**, a secular newspaper of general circulation within the County of Lake regularly published in the City of Grayslake in the County of Lake and State of Illinois, and which has been so published for more than 12 months prior to the first publication of hereunto annexed notice or advertisement relating to the matter of

*Announcement CERCLA Five-Year Review*  
was published in said newspaper  
time(s) on the following date(s):

*December 7, 2012*

I further certify that said newspaper is a newspaper as defined by the terms and conditions of Chapter 100, paragraph 1 et. Seq., Illinois Revised Statutes 1981.

Given under my hand at Grayslake, Illinois

  
Publisher

Account # 10063654  
Amount \$132.72

## PUBLIC NOTICE

CERCLA Five-Year Review

### FIRST CERCLA FIVE-YEAR REVIEW ANNOUNCED

The Department of the Navy (Navy), the Illinois Environmental Protection Agency (IEPA) and the United States Environmental Protection Agency (U.S. EPA) are in the process of conducting the first Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Five-Year Review at fifteen sites at Naval Station Great Lakes, Illinois (NAVSTA Great Lakes). The purpose of this review

is to ensure that the Navy's activities to clean up the contaminated sites are continuing to protect the public's health and the environment. The review also serves to ensure that the clean-up activities are proceeding as planned.

CERCLA requires that a review be conducted where remedial actions taken at a site resulted in hazardous substances, pollutants, or contaminants remaining at a site above levels that allow for unlimited use and unrestricted exposure. The review will be conducted every five years to ensure protection of human health and the environment. For completed actions, the review will determine if the measures taken are still successful in protecting the worker, the public and the environment. For actions that have not been completed but are in progress, the review will evaluate whether the measures to be taken will be protective when completed if there is sufficient information available to make that judgment.

The Navy will conduct the CERCLA five-year review in coordination with the IEPA and U.S. Environmental Protection Agency. The IEPA is the lead regulatory agency for the sites and is ultimately responsible for certifying the review. The five-year review will:

\* Evaluate the performance of the selected removal and remedial cleanup actions for subject sites LUC 1 (Bldg 106), LUC 2 (Bldg 145 UST), LUC 3 (Bldg 415), LUC 4 (Bldg 520), LUC 5 (Bldg 912), LUC 6 (Bldg 239), LUC 7 (Bldg 3400), LUC 8 (Bldg 13), LUC 9 (Bldg 324), LUC 11 (Site 22), LUC 12 (Site 3), LUC 13 (Site 2), LUC 14 (Bldg 229 UST), LUC 16 (UST Site 11, Bldg 68H), Site 00001 (Golf Course Landfill), and Site 00004 (Fire Fighting Training Unit) to determine whether they are protective of human health and the environment.

\* Confirm that immediate threats have been addressed, or, where a CERCLA response action is in progress, that the selected remedy, when complete, will be protective of human health and the environment and compliant with state and federal laws.

\* Confirm, for sites that are in the Operations and Maintenance phases, that the selected remedy remains protective and will remain protective for as long as the site restrictions remain.

\* Recommend actions to improve performance when the five-year review indicates that a remedy is not performing as designed.

\* Summarize findings and recommendations from the Five Year review in a report format and be made available to the public.

The Site Administrative Record

and all documents used for selecting the preferred clean-up alternative for each site at NAVSTA Great Lakes, is available for public review and copying through Ben Simes at the address listed below:

Ben Simes, CHMM  
NAVFAC IPT EV  
201 Decatur Ave., Building 1A  
Great Lakes, IL 60088-2801

Phone: 847-688-2600 x320  
Email: benjamin.simes@navy.mil  
(Published in the Great Lakes Bulletin December 7, 2012)

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- Confirm, for sites that are in the Operations and Maintenance phases, that the selected remedy remains protective and will remain protective for as long as the site restrictions remain.
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Email: benjamin.simes@navy.mil

## **Appendix C**

### **Site Inspection Checklists**

## **2012 Site Inspection Forms**

Please note that “O&M” is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as “system operations” since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

## Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. “N/A” refers to “not applicable.”)

I. SITE INFORMATION															
<b>Site name:</b> LUC 11 – Site 22, Former Building 105		<b>Date of inspection:</b> September 20, 2012													
<b>Location and Region:</b> Naval Station Great Lakes, Region V		<b>EPA ID:</b> 7170024577													
<b>Agency, office, or company leading the five-year review:</b> Navy		<b>Weather/temperature:</b> Sunny, Average Temp = 58°F													
<b>Remedy Includes:</b> (Check all that apply) <table border="0" style="width: 100%;"> <tr> <td>Landfill cover/containment</td> <td>Monitored natural attenuation</td> </tr> <tr> <td>Access controls</td> <td>Groundwater containment</td> </tr> <tr> <td><u>Institutional controls</u></td> <td>Vertical barrier walls</td> </tr> <tr> <td>Groundwater pump and treatment</td> <td></td> </tr> <tr> <td>Surface water collection and treatment</td> <td></td> </tr> <tr> <td colspan="2">Other: <i>The remedy includes an asphalt parking lot with a high density polyethylene (HDPE) liner as an engineered barrier.</i></td> </tr> </table>				Landfill cover/containment	Monitored natural attenuation	Access controls	Groundwater containment	<u>Institutional controls</u>	Vertical barrier walls	Groundwater pump and treatment		Surface water collection and treatment		Other: <i>The remedy includes an asphalt parking lot with a high density polyethylene (HDPE) liner as an engineered barrier.</i>	
Landfill cover/containment	Monitored natural attenuation														
Access controls	Groundwater containment														
<u>Institutional controls</u>	Vertical barrier walls														
Groundwater pump and treatment															
Surface water collection and treatment															
Other: <i>The remedy includes an asphalt parking lot with a high density polyethylene (HDPE) liner as an engineered barrier.</i>															
<b>Attachments:</b> Site photos included.															
II. INTERVIEWS (Check all that apply)															
<b>1. O&amp;M site manager</b> <table border="0" style="width: 100%;"> <tr> <td><u>Benjamin Simes</u></td> <td><u>Project Manager</u></td> <td><u>9/20/2012</u></td> </tr> <tr> <td style="text-align: center;">Name</td> <td style="text-align: center;">Title</td> <td style="text-align: center;">Date</td> </tr> </table> Interviewed <u>at site</u> at office by phone Phone no.: 415-828-9326 Problems, suggestions; Report attached _____ _____				<u>Benjamin Simes</u>	<u>Project Manager</u>	<u>9/20/2012</u>	Name	Title	Date						
<u>Benjamin Simes</u>	<u>Project Manager</u>	<u>9/20/2012</u>													
Name	Title	Date													
<b>2. O&amp;M staff</b> <table border="0" style="width: 100%;"> <tr> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td style="text-align: center;">Name</td> <td style="text-align: center;">Title</td> <td style="text-align: center;">Date</td> </tr> </table> Interviewed at site at office by phone Phone no. _____ Problems, suggestions; Report attached _____ _____				_____	_____	_____	Name	Title	Date						
_____	_____	_____													
Name	Title	Date													



III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	<b>O&amp;M Documents</b> O&M manual As-built drawings Maintenance logs Remarks_____	Readily available Readily available Readily available	Up to date Up to date Up to date	<u>N/A</u> <u>N/A</u> <u>N/A</u>
2.	<b>Site-Specific Health and Safety Plan</b> Contingency plan/emergency response plan Remarks_____	Readily available Readily available	Up to date Up to date	<u>N/A</u> <u>N/A</u>
3.	<b>O&amp;M and OSHA Training Records</b> Remarks_____	Readily available	Up to date	<u>N/A</u>
4.	<b>Permits and Service Agreements</b> Air discharge permit Effluent discharge Waste disposal, POTW Other permits_____ Remarks_____	Readily available Readily available Readily available Readily available	Up to date Up to date Up to date Up to date	<u>N/A</u> <u>N/A</u> N/A <u>N/A</u>
5.	<b>Gas Generation Records</b> Remarks_____	Readily available	Up to date	<u>N/A</u>
6.	<b>Settlement Monument Records</b> Remarks_____	Readily available	Up to date	<u>N/A</u>
7.	<b>Groundwater Monitoring Records</b> Remarks_____	Readily available	Up to date	<u>N/A</u>
8.	<b>Leachate Extraction Records</b> Remarks_____	Readily available	Up to date	<u>N/A</u>
9.	<b>Discharge Compliance Records</b> Air Water (effluent) Remarks_____	Readily available Readily available	Up to date Up to date	<u>N/A</u> N/A
10.	<b>Daily Access/Security Logs</b> Remarks_____	Readily available	Up to date	<u>N/A</u>

<b>IV. O&amp;M COSTS: Not reviewed during visit</b>																																											
1.	<b>O&amp;M Organization</b> State in-house _____ Contractor for State _____ PRP in-house _____ Contractor for PRP _____ Federal Facility in-house _____ Contractor for Federal Facility _____ Other _____ _____																																										
2.	<b>O&amp;M Cost Records</b> Readily available _____ Up to date _____ Funding mechanism/agreement in place _____ Original O&M cost estimate _____ Breakdown attached _____  <div style="text-align: center;">Total annual cost by year for review period if available</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">From _____</td> <td style="width: 10%;">To _____</td> <td style="width: 20%;">_____</td> <td style="width: 50%;">Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> </table>			From _____	To _____	_____	Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	Breakdown attached	Date	Date	Total cost	
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3.	<b>Unanticipated or Unusually High O&amp;M Costs During Review Period</b> Describe costs and reasons: _____ _____ _____ _____ _____ _____																																										
<b>V. ACCESS AND INSTITUTIONAL CONTROLS</b>																																											
<div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; display: inline-block;">Applicable</div> N/A																																											
<b>A. Fencing</b>																																											
1.	<b>Fencing damaged</b> Location shown on site map _____ Gates secured <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; display: inline-block;">N/A</div> Remarks: <i>No fencing is in place.</i>																																										
<b>B. Other Access Restrictions</b>																																											
1.	<b>Signs and other security measures</b> Location shown on site map _____ N/A Remarks: <i>Base-wide access is restricted, but once inside the Base, access to this LUC is not restricted. Signs are located around the site on poles.</i>																																										

<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b>		
	Site conditions imply ICs not properly implemented	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Site conditions imply ICs not being fully enforced	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Type of monitoring (e.g., self-reporting, drive by) <i>Visual inspection – site walk</i>		
	Frequency <i>Annual</i>		
	Responsible party/agency <i>U.S. Department of the Navy, Great Lakes Naval Training Center</i>		
	Contact <i>Benjamin Simes</i>	<i>Project Manager</i>	<i>9/20/12 415-828-9326</i>
	Name	Title	Date Phone no.
	Reporting is up-to-date	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Reports are verified by the lead agency	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Specific requirements in deed or decision documents have been met	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Violations have been reported	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Other problems or suggestions: <i>Report attached</i>		
	<i>Annual inspections are taking place. Documentation of inspections, verification that inspection results have been supplied to the IEPA and U.S. EPA, and documentation of corrective measures taken to address deficiencies (if applicable) were available for 2009 through 2011.</i>		
2.	<b>Adequacy</b>	ICs are adequate <input checked="" type="radio"/> ICs are inadequate <input type="radio"/>	N/A <input type="radio"/>
	Remarks: <i>The institutional controls are adequately protective of human health and the environment when coupled with the engineered barrier.</i>		
<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	Location shown on site map <input checked="" type="radio"/> No vandalism evident <input type="radio"/>	
	Remarks _____		
2.	<b>Land use changes on site</b>	<input checked="" type="radio"/> N/A <input type="radio"/>	
	Remarks _____		
3.	<b>Land use changes off site</b>	<input checked="" type="radio"/> N/A <input type="radio"/>	
	Remarks _____		
<b>VI. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b>	<input checked="" type="radio"/> Applicable <input type="radio"/>	N/A <input type="radio"/>	
1.	<b>Roads damaged</b>	Location shown on site map <input checked="" type="radio"/> Roads adequate <input type="radio"/>	N/A <input type="radio"/>
	Remarks _____		

<b>B. Other Site Conditions</b>			
Remarks: <i>This was a former dry cleaning facility and hazardous waste storage area. Monitoring wells are still in place on the site. Chlorinated solvent concentrations remain in soil that exceed state standards. According to Mr. Simes, there is a liner under the pavement. There were cracks and surface bulging noted in the asphalt around former ERH probe locations.</i>			
<b>VII. LANDFILL COVERS</b> Applicable <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">N/A</span>			
<b>A. Landfill Surface</b>			
1.	<b>Settlement</b> (Low spots) Areal extent _____ Depth _____ Remarks _____	Location shown on site map Depth _____	Settlement not evident
2.	<b>Cracks</b> Lengths _____ Widths _____ Remarks _____	Location shown on site map Depths _____	Cracking not evident
3.	<b>Erosion</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	Erosion not evident
4.	<b>Holes</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	Holes not evident
5.	<b>Vegetative Cover</b> Grass _____ Trees/Shrubs (indicate size and locations on a diagram) Remarks _____	Cover properly established	No signs of stress
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> Remarks _____	N/A	
7.	<b>Bulges</b> Areal extent _____ Remarks _____	Location shown on site map Height _____	Bulges not evident
8.	<b>Wet Areas/Water Damage</b> Wet areas _____ Ponding _____ Seeps _____ Soft subgrade _____ Remarks _____	Wet areas/water damage not evident Location shown on site map Location shown on site map Location shown on site map Location shown on site map	Areal extent _____ Areal extent _____ Areal extent _____ Areal extent _____

9.	<b>Slope Instability</b>	Slides	Location shown on site map	No evidence of slope instability
	Areal extent _____			
	Remarks _____			
	_____			
<b>B. Benches</b> Applicable                      N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)				
1.	<b>Flows Bypass Bench</b>		Location shown on site map	N/A or okay
	Remarks _____			
	_____			
2.	<b>Bench Breached</b>		Location shown on site map	N/A or okay
	Remarks _____			
	_____			
3.	<b>Bench Overtopped</b>		Location shown on site map	N/A or okay
	Remarks _____			
	_____			
<b>C. Letdown Channels</b> Applicable                      N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)				
1.	<b>Settlement</b>		Location shown on site map	No evidence of settlement
	Areal extent _____		Depth _____	
	Remarks _____			
	_____			
2.	<b>Material Degradation</b>		Location shown on site map	No evidence of degradation
	Material type _____		Areal extent _____	
	Remarks _____			
	_____			
3.	<b>Erosion</b>		Location shown on site map	No evidence of erosion
	Areal extent _____		Depth _____	
	Remarks _____			
	_____			

4.	<b>Undercutting</b>	Location shown on site map	No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____		
5.	<b>Obstructions</b>	Type _____	No obstructions
	Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____		
6.	<b>Excessive Vegetative Growth</b>	Type _____	
	No evidence of excessive growth		
	Vegetation in channels does not obstruct flow		
	Location shown on site map	Areal extent _____	
	Remarks _____		
<b>D. Cover Penetrations</b> Applicable    N/A			
1.	<b>Gas Vents</b>	Active    Passive	
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance
	N/A		
	Remarks _____		
2.	<b>Gas Monitoring Probes</b>		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance    N/A
	Remarks _____		
3.	<b>Monitoring Wells</b> (within surface area of landfill)		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance    N/A
	Remarks _____		
4.	<b>Leachate Extraction Wells</b>		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance    N/A
	Remarks _____		
5.	<b>Settlement Monuments</b>	Located	Routinely surveyed    N/A
	Remarks _____		

<b>E. Gas Collection and Treatment</b>		Applicable	N/A
1.	<b>Gas Treatment Facilities</b> Flaring                      Thermal destruction                      Collection for reuse Good condition      Needs Maintenance Remarks _____ _____		
2.	<b>Gas Collection Wells, Manifolds and Piping</b> Good condition      Needs Maintenance Remarks _____ _____		
3.	<b>Gas Monitoring Facilities</b> ( <i>e.g.</i> , gas monitoring of adjacent homes or buildings) Good condition      Needs Maintenance                      N/A Remarks _____ _____		
<b>F. Cover Drainage Layer</b>		Applicable	N/A
1.	<b>Outlet Pipes Inspected</b> Functioning                      N/A Remarks _____ _____		
2.	<b>Outlet Rock Inspected</b> Functioning                      N/A Remarks _____ _____		
<b>G. Detention/Sedimentation Ponds</b>		Applicable	N/A
1.	<b>Siltation</b> Areal extent _____                      Depth _____                      N/A Siltation not evident Remarks _____ _____		
2.	<b>Erosion</b> Areal extent _____                      Depth _____ Erosion not evident Remarks _____ _____		
3.	<b>Outlet Works</b> Functioning                      N/A Remarks _____ _____		
4.	<b>Dam</b> Functioning                      N/A Remarks _____ _____		

<b>H. Retaining Walls</b>		Applicable	N/A
1.	<b>Deformations</b> Horizontal displacement _____ Rotational displacement _____ Remarks _____	Location shown on site map	Deformation not evident Vertical displacement _____
2.	<b>Degradation</b> Remarks _____	Location shown on site map	Degradation not evident
<b>I. Perimeter Ditches/Off-Site Discharge</b>		Applicable	N/A
1.	<b>Siltation</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	Siltation not evident
2.	<b>Vegetative Growth</b> Vegetation does not impede flow Areal extent _____ Remarks _____	Location shown on site map Type _____	N/A
3.	<b>Erosion</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	Erosion not evident
4.	<b>Discharge Structure</b> Remarks _____	Functioning	N/A
<b>VIII. VERTICAL BARRIER WALLS</b>		Applicable	N/A
1.	<b>Settlement</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	Settlement not evident
2.	<b>Performance Monitoring</b> Type of monitoring _____ Performance not monitored Frequency _____ Head differential _____ Remarks _____	Evidence of breaching	

<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		Applicable	N/A
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Pumps, Wellhead Plumbing, and Electrical</b> Good condition   All required wells properly operating   Needs Maintenance   N/A Remarks _____ _____ _____		
2.	<b>Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available   Good condition   Requires upgrade   Needs to be provided Remarks _____ _____ _____		
<b>B. Surface Water Collection Structures, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Collection Structures, Pumps, and Electrical</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
2.	<b>Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available   Good condition   Requires upgrade   Needs to be provided Remarks _____ _____ _____		

C. Treatment System		Applicable	N/A
1.	<b>Treatment Train</b> (Check components that apply) Metals removal                      Oil/water separation                      Bioremediation Air stripping                                      Carbon adsorbers Filters _____ Additive ( <i>e.g.</i> , chelation agent, flocculent) _____ Others _____ Good condition                      Needs Maintenance Sampling ports properly marked and functional Sampling/maintenance log displayed and up to date Equipment properly identified Quantity of groundwater treated annually _____ Quantity of surface water treated annually _____ Remarks _____ _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) N/A                      Good condition                      Needs Maintenance Remarks _____ _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> N/A                      Good condition                      Proper secondary containment                      Needs Maintenance Remarks _____ _____		
4.	<b>Discharge Structure and Appurtenances</b> N/A                      Good condition                      Needs Maintenance Remarks _____ _____		
5.	<b>Treatment Building(s)</b> N/A                      Good condition (esp. roof and doorways)                      Needs repair Chemicals and equipment properly stored Remarks _____ _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy) Properly secured/locked                      Functioning                      Routinely sampled                      Good condition All required wells located                      Needs Maintenance                      N/A Remarks _____ _____		
<b>D. Monitoring Data</b>			
1.	Monitoring Data Is routinely submitted on time                      Is of acceptable quality		
2.	Monitoring data suggests: Groundwater plume is effectively contained                      Contaminant concentrations are declining		

<b>D. Monitored Natural Attenuation</b>				
1.	<b>Monitoring Wells</b> (natural attenuation remedy)			
	Properly secured/locked	Functioning	Routinely sampled	Good condition
	All required wells located	Needs Maintenance		N/A
	Remarks _____			
<b>X. OTHER REMEDIES</b>				
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.				
<b>XI. OVERALL OBSERVATIONS</b>				
<b>A. Implementation of the Remedy</b>				
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.). <u>The remedy is intended to restrict reuse of the site to industrial/commercial land use, prevent exposure to contaminated soil left in place, and prohibit groundwater use on a base-wide level. The remedy is effective. Land use has not changed. Overall, the engineered barrier is intact with the exception of some surface cracks and bulges and continues to prevent exposure to contaminated soil, and no wells have been installed at this site.</u>				
<b>B. Adequacy of O&amp;M</b>				
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.				
_____				
_____				
_____				
_____				
_____				
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_____				
_____				
_____				

<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>
	<p>Describe issues and observations such as unexpected changes in the cost or scope of O&amp;M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.</p> <p><u>No observations or issues that may cause a higher frequency of repairs or maintenance noted.</u></p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<b>D.</b>	<b>Opportunities for Optimization</b>
	<p>Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.</p> <p><u>None observed</u></p>

Please note that “O&M” is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as “system operations” since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

## Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. “N/A” refers to “not applicable.”)

I. SITE INFORMATION			
<b>Site name:</b> LUC 12 – Site 3		<b>Date of inspection:</b> September 20, 2012	
<b>Location and Region:</b> Naval Station Great Lakes, Region V		<b>EPA ID:</b> 7170024577	
<b>Agency, office, or company leading the five-year review:</b> Navy		<b>Weather/temperature:</b> Sunny, Average Temp = 58°F	
<b>Remedy Includes:</b> (Check all that apply) <div style="display: flex; justify-content: space-between;"> <div> Landfill cover/containment  Access controls  Institutional controls  Groundwater pump and treatment  Surface water collection and treatment  Other: <i>The remedy includes a landfill cover that complies with IEPA regulations, prevents exposure to landfill waste, and reduces storm water infiltration.</i> </div> <div> Monitored natural attenuation  Groundwater containment  Vertical barrier walls </div> </div>			
<b>Attachments:</b> Site photos included.			
II. INTERVIEWS (Check all that apply)			
1. <b>O&amp;M site manager</b> <u>Benjamin Simes</u> <u>Project Manager</u> <u>9/20/2012</u> <div style="display: flex; justify-content: space-between;"> <div>Name</div> <div>Title</div> <div>Date</div> </div> Interviewed <u>at site</u> at office by phone      Phone no.: 415-828-9326 Problems, suggestions; Report attached _____ _____			
2. <b>O&amp;M staff</b> _____ <div style="display: flex; justify-content: space-between;"> <div>Name</div> <div>Title</div> <div>Date</div> </div> Interviewed at site at office by phone      Phone no. _____ Problems, suggestions; Report attached _____ _____			



III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	<b>O&amp;M Documents</b> O&M manual As-built drawings Maintenance logs Remarks _____	Readily available Readily available Readily available	Up to date Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A <input type="radio"/> N/A
2.	<b>Site-Specific Health and Safety Plan</b> Contingency plan/emergency response plan Remarks _____	Readily available Readily available	Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A
3.	<b>O&amp;M and OSHA Training Records</b> Remarks _____	Readily available	Up to date	<input type="radio"/> N/A
4.	<b>Permits and Service Agreements</b> Air discharge permit Effluent discharge Waste disposal, POTW Other permits _____ Remarks _____	Readily available Readily available Readily available Readily available	Up to date Up to date Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A <input type="radio"/> N/A <input type="radio"/> N/A
5.	<b>Gas Generation Records</b> Remarks _____	Readily available	Up to date	<input type="radio"/> N/A
6.	<b>Settlement Monument Records</b> Remarks _____	Readily available	Up to date	<input type="radio"/> N/A
7.	<b>Groundwater Monitoring Records</b> Remarks _____	Readily available	Up to date	<input type="radio"/> N/A
8.	<b>Leachate Extraction Records</b> Remarks _____	Readily available	Up to date	<input type="radio"/> N/A
9.	<b>Discharge Compliance Records</b> Air Water (effluent) Remarks _____	Readily available Readily available	Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A
10.	<b>Daily Access/Security Logs</b> Remarks _____	Readily available	Up to date	<input type="radio"/> N/A

<b>IV. O&amp;M COSTS: Not reviewed during visit</b>																																																					
1.	<b>O&amp;M Organization</b> State in-house _____ Contractor for State PRP in-house _____ Contractor for PRP <u>Federal Facility in-house</u> _____ Contractor for Federal Facility Other _____																																																				
2.	<b>O&amp;M Cost Records</b> Readily available _____ Up to date _____ Not Reviewed _____ Funding mechanism/agreement in place _____ Original O&M cost estimate _____ Breakdown attached _____  <div style="text-align: center;">Total annual cost by year for review period if available</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">From _____</td> <td style="width: 10%;">To _____</td> <td style="width: 20%;"></td> <td style="width: 20%;"></td> <td style="width: 30%;">Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> </tr> </table>			From _____	To _____			Breakdown attached	Date	Date	Total cost			From _____	To _____			Breakdown attached	Date	Date	Total cost			From _____	To _____			Breakdown attached	Date	Date	Total cost			From _____	To _____			Breakdown attached	Date	Date	Total cost			From _____	To _____			Breakdown attached	Date	Date	Total cost		
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3.	<b>Unanticipated or Unusually High O&amp;M Costs During Review Period</b> Describe costs and reasons: _____ _____ _____ _____ _____ _____																																																				
<b>V. ACCESS AND INSTITUTIONAL CONTROLS</b>																																																					
<span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">Applicable</span> N/A																																																					
<b>A. Fencing</b>																																																					
1.	<b>Fencing damaged</b> Location shown on site map _____ Remarks: <i>Fencing is in place and intact.</i>	<span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">Gates secured</span>	N/A																																																		
<b>B. Other Access Restrictions</b>																																																					
1.	<b>Signs and other security measures</b> Location shown on site map _____ Remarks: <i>Access to this LUC is restricted by a locked gate that was in good working order.</i>	<span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">N/A</span>																																																			

<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b>		
	Site conditions imply ICs not properly implemented	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Site conditions imply ICs not being fully enforced	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Type of monitoring (e.g., self-reporting, drive by)	Visual inspection – site walk	
	Frequency	Annual	
	Responsible party/agency	U.S. Department of the Navy, Great Lakes Naval Training Center	
	Contact	Benjamin Simes	Project Manager
		9/20/12	415-828-9326
		Name	Title
		Date	Phone no.
	Reporting is up-to-date	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Reports are verified by the lead agency	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Specific requirements in deed or decision documents have been met	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Violations have been reported	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Other problems or suggestions:	Report attached	
	Annual inspections are taking place. Documentation of inspections, verification that inspection results have been supplied to the IEPA and U.S. EPA, and documentation of corrective measures taken to address deficiencies (if applicable) were available for 2009 through 2011.		
2.	<b>Adequacy</b>	ICs are adequate <input checked="" type="radio"/>	ICs are inadequate <input type="radio"/> N/A <input type="radio"/>
	Remarks: The institutional controls are adequately protective of human health and the environment when coupled with the engineered barrier.		
<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	Location shown on site map	No vandalism evident <input checked="" type="radio"/>
	Remarks _____		
2.	<b>Land use changes on site</b>	N/A <input checked="" type="radio"/>	
	Remarks _____		
3.	<b>Land use changes off site</b>	N/A <input checked="" type="radio"/>	
	Remarks _____		
<b>VI. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b>	Applicable <input checked="" type="radio"/>	N/A <input type="radio"/>	
1.	<b>Roads damaged</b>	Location shown on site map	Roads adequate <input checked="" type="radio"/> N/A <input type="radio"/>
	Remarks _____		

<b>B. Other Site Conditions</b>			
Remarks: <i>Two of the landfill vents were not functioning/turning. A small subsidence area was noted on the south side of the landfill, and some ruts from vehicle traffic were observed near the southeast corner of the landfill.</i>			
<b>VII. LANDFILL COVERS</b> <u>Applicable</u> N/A			
<b>A. Landfill Surface</b>			
1.	<b>Settlement</b> (Low spots) Areal extent <u>30 ft x 20 ft</u> Depth _____ Remarks: <i>One subsidence area was observed on the south side of the landfill.</i>	Location shown on site map Depth _____	Settlement not evident
2.	<b>Cracks</b> Lengths _____ Widths _____ Depths _____ Remarks _____	Location shown on site map	<u>Cracking not evident</u>
3.	<b>Erosion</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	<u>Erosion not evident</u>
4.	<b>Holes</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	<u>Holes not evident</u>
5.	<b>Vegetative Cover</b> Trees/Shrubs (indicate size and locations on a diagram) Remarks <u>Observed an area of bare soil on the west slope at the 4<sup>th</sup> vent well</u>	Grass <u>Cover properly established</u>	<u>No signs of stress</u>
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> Remarks _____	<u>N/A</u>	
7.	<b>Bulges</b> Areal extent _____ Remarks _____	Location shown on site map Height _____	<u>Bulges not evident</u>
8.	<b>Wet Areas/Water Damage</b> Wet areas _____ Ponding _____ Seeps _____ Soft subgrade _____ Remarks _____	<u>Wet areas/water damage not evident</u> Location shown on site map _____ Location shown on site map _____ Location shown on site map _____ Location shown on site map _____	Areal extent _____ Areal extent _____ Areal extent _____ Areal extent _____

9.	<b>Slope Instability</b> Areal extent _____ Remarks _____	Slides	Location shown on site map	No evidence of slope instability
<b>B. Benches</b> Applicable      N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)				
1.	<b>Flows Bypass Bench</b> Remarks _____		Location shown on site map	N/A or okay
2.	<b>Bench Breached</b> Remarks _____		Location shown on site map	N/A or okay
3.	<b>Bench Overtopped</b> Remarks _____		Location shown on site map	N/A or okay
<b>C. Letdown Channels</b> Applicable      N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)				
1.	<b>Settlement</b> Areal extent _____ Remarks _____		Location shown on site map Depth _____	No evidence of settlement
2.	<b>Material Degradation</b> Material type _____ Remarks _____		Location shown on site map Areal extent _____	No evidence of degradation
3.	<b>Erosion</b> Areal extent _____ Remarks _____		Location shown on site map Depth _____	No evidence of erosion

4.	<b>Undercutting</b>	Location shown on site map	No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____		
5.	<b>Obstructions</b>	Type _____	No obstructions
	Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____		
6.	<b>Excessive Vegetative Growth</b>	Type _____	
	No evidence of excessive growth		
	Vegetation in channels does not obstruct flow		
	Location shown on site map	Areal extent _____	
	Remarks _____		
<b>D. Cover Penetrations</b> Applicable    N/A			
1.	<b>Gas Vents</b>	Active <u>Passive</u>	
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance
	N/A		
	Remarks: <i>The second and fourth vents away from the gate were not turning. They should be checked to make sure they remain functional.</i>		
2.	<b>Gas Monitoring Probes</b>		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance <u>N/A</u>
	Remarks _____		
3.	<b>Monitoring Wells</b> (within surface area of landfill)		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance <u>N/A</u>
	Remarks _____		
4.	<b>Leachate Extraction Wells</b>		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance <u>N/A</u>
	Remarks _____		
5.	<b>Settlement Monuments</b>	Located	Routinely surveyed <u>N/A</u>
	Remarks _____		

<b>E. Gas Collection and Treatment</b>		Applicable	N/A
1.	<b>Gas Treatment Facilities</b> Flaring                      Thermal destruction                      Collection for reuse Good condition   Needs Maintenance Remarks _____ _____		
2.	<b>Gas Collection Wells, Manifolds and Piping</b> Good condition   Needs Maintenance Remarks _____ _____		
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings) Good condition   Needs Maintenance                      N/A Remarks _____ _____		
<b>F. Cover Drainage Layer</b>		Applicable	N/A
1.	<b>Outlet Pipes Inspected</b> Functioning                      N/A Remarks _____ _____		
2.	<b>Outlet Rock Inspected</b> Functioning                      N/A Remarks _____ _____		
<b>G. Detention/Sedimentation Ponds</b>		Applicable	N/A
1.	<b>Siltation</b> Areal extent _____                      Depth _____                      N/A Siltation not evident Remarks _____ _____		
2.	<b>Erosion</b> Areal extent _____                      Depth _____ Erosion not evident Remarks _____ _____		
3.	<b>Outlet Works</b> Functioning                      N/A Remarks _____ _____		
4.	<b>Dam</b> Functioning                      N/A Remarks _____ _____		

<b>H. Retaining Walls</b>		Applicable	N/A
1.	<b>Deformations</b>	Location shown on site map	Deformation not evident
	Horizontal displacement_____		Vertical displacement_____
	Rotational displacement_____		
	Remarks_____		
2.	<b>Degradation</b>	Location shown on site map	Degradation not evident
	Remarks_____		
<b>I. Perimeter Ditches/Off-Site Discharge</b>		Applicable	N/A
1.	<b>Siltation</b>	Location shown on site map	Siltation not evident
	Areal extent_____	Depth_____	
	Remarks_____		
2.	<b>Vegetative Growth</b>	Location shown on site map	N/A
	Vegetation does not impede flow		
	Areal extent_____	Type_____	
	Remarks_____		
3.	<b>Erosion</b>	Location shown on site map	Erosion not evident
	Areal extent_____	Depth_____	
	Remarks_____		
4.	<b>Discharge Structure</b>	Functioning	N/A
	Remarks_____		
<b>VIII. VERTICAL BARRIER WALLS</b>		Applicable	N/A
1.	<b>Settlement</b>	Location shown on site map	Settlement not evident
	Areal extent_____	Depth_____	
	Remarks_____		
2.	<b>Performance Monitoring</b>	Type of monitoring_____	
	Performance not monitored		
	Frequency_____	Evidence of breaching	
	Head differential_____		
	Remarks_____		

<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		Applicable	N/A
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Pumps, Wellhead Plumbing, and Electrical</b> Good condition   All required wells properly operating   Needs Maintenance   N/A Remarks _____ _____ _____		
2.	<b>Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available   Good condition   Requires upgrade   Needs to be provided Remarks _____ _____ _____		
<b>B. Surface Water Collection Structures, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Collection Structures, Pumps, and Electrical</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
2.	<b>Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available   Good condition   Requires upgrade   Needs to be provided Remarks _____ _____ _____		

C. Treatment System		Applicable	N/A
1.	<b>Treatment Train</b> (Check components that apply) Metals removal                      Oil/water separation                      Bioremediation Air stripping                                      Carbon adsorbers Filters _____ Additive (e.g., chelation agent, flocculent) _____ Others _____ Good condition                      Needs Maintenance Sampling ports properly marked and functional Sampling/maintenance log displayed and up to date Equipment properly identified Quantity of groundwater treated annually _____ Quantity of surface water treated annually _____ Remarks _____ _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) N/A                      Good condition                      Needs Maintenance Remarks _____ _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> N/A                      Good condition                      Proper secondary containment                      Needs Maintenance Remarks _____ _____		
4.	<b>Discharge Structure and Appurtenances</b> N/A                      Good condition                      Needs Maintenance Remarks _____ _____		
5.	<b>Treatment Building(s)</b> N/A                      Good condition (esp. roof and doorways)                      Needs repair Chemicals and equipment properly stored Remarks _____ _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy) Properly secured/locked                      Functioning                      Routinely sampled                      Good condition All required wells located                      Needs Maintenance                      N/A Remarks _____ _____		
<b>D. Monitoring Data</b>			
1.	Monitoring Data Is routinely submitted on time                      Is of acceptable quality		
2.	Monitoring data suggests: Groundwater plume is effectively contained                      Contaminant concentrations are declining		

<b>D. Monitored Natural Attenuation</b>			
1.	<b>Monitoring Wells</b> (natural attenuation remedy) <div> <div>Properly secured/locked</div> <div>All required wells located</div> <div>Remarks _____</div> </div>	<div>Functioning</div> <div>Needs Maintenance</div>	<div>Routinely sampled</div> <div>Good condition</div> <div>N/A</div>
<b>X. OTHER REMEDIES</b>			
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.			
<b>XI. OVERALL OBSERVATIONS</b>			
<b>A. Implementation of the Remedy</b>			
<p>Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).</p> <p><u>The remedy is intended to restrict reuse of the site to industrial/commercial land use, prevent exposure to landfill refuse, and prohibit groundwater use on a base-wide level. The remedy is effective. Land use has not changed. Overall, the landfill cover is in good condition. Two of the passive vents should be checked to see if they are still functioning.</u></p>			
<b>B. Adequacy of O&amp;M</b>			
<p>Describe issues and observations related to the implementation and scope of O&amp;M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.</p> <p><u>O&amp;M procedures appear to be supportive of long-term protectiveness of the LUCs in prohibit soil disturbance, groundwater use, and development of the site. O&amp;M activities are maintaining the cover, preventing it's erosion and deterioration.</u></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>			

<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>
	<p>Describe issues and observations such as unexpected changes in the cost or scope of O&amp;M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.</p> <p><u>No issues were observed that indicate increased repairs or significant problems may appear in the near future or that protectiveness of the remedy may be compromised.</u></p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<b>D.</b>	<b>Opportunities for Optimization</b>
	<p>Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.</p> <p><u>None observed</u></p>

Please note that “O&M” is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as “system operations” since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

## Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. “N/A” refers to “not applicable.”)

I. SITE INFORMATION			
<b>Site name:</b> LUC 13 – Site 2		<b>Date of inspection:</b> September 20, 2012	
<b>Location and Region:</b> Naval Station Great Lakes, Region V		<b>EPA ID:</b> 7170024577	
<b>Agency, office, or company leading the five-year review:</b> Navy		<b>Weather/temperature:</b> Sunny, Average Temp = 58°F	
<b>Remedy Includes:</b> (Check all that apply) <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Landfill cover/containment  Access controls  Institutional controls  Groundwater pump and treatment  Surface water collection and treatment  Other: <i>The remedy includes a landfill cover that complies with IEPA regulations, prevents exposure to landfill waste, and reduces storm water infiltration.</i> </div> <div style="width: 45%;"> Monitored natural attenuation  Groundwater containment  Vertical barrier walls </div> </div>			
<b>Attachments:</b> Site photos included.			
II. INTERVIEWS (Check all that apply)			
1. <b>O&amp;M site manager</b> <u>Benjamin Simes</u> <u>Project Manager</u> <u>9/20/2012</u> <div style="display: flex; justify-content: space-between;"> <div>Name</div> <div>Title</div> <div>Date</div> </div> Interviewed <u>at site</u> at office by phone Phone no.: 415-828-9326 Problems, suggestions; Report attached _____ _____			
2. <b>O&amp;M staff</b> _____ <div style="display: flex; justify-content: space-between;"> <div>Name</div> <div>Title</div> <div>Date</div> </div> Interviewed at site at office by phone Phone no. _____ Problems, suggestions; Report attached _____ _____			



<b>III. ON-SITE DOCUMENTS &amp; RECORDS VERIFIED</b> (Check all that apply)				
1.	<b>O&amp;M Documents</b> O&M manual As-built drawings Maintenance logs Remarks_____	Readily available Readily available Readily available	Up to date Up to date Up to date	<input checked="" type="radio"/> N/A <input checked="" type="radio"/> N/A <input checked="" type="radio"/> N/A
2.	<b>Site-Specific Health and Safety Plan</b> Contingency plan/emergency response plan Remarks_____	Readily available Readily available	Up to date Up to date	<input checked="" type="radio"/> N/A <input checked="" type="radio"/> N/A
3.	<b>O&amp;M and OSHA Training Records</b> Remarks_____	Readily available	Up to date	<input checked="" type="radio"/> N/A
4.	<b>Permits and Service Agreements</b> Air discharge permit Effluent discharge Waste disposal, POTW Other permits_____ Remarks_____	Readily available Readily available Readily available Readily available	Up to date Up to date Up to date Up to date	<input checked="" type="radio"/> N/A <input checked="" type="radio"/> N/A N/A <input checked="" type="radio"/> N/A
5.	<b>Gas Generation Records</b> Remarks_____	Readily available	Up to date	<input checked="" type="radio"/> N/A
6.	<b>Settlement Monument Records</b> Remarks_____	Readily available	Up to date	<input checked="" type="radio"/> N/A
7.	<b>Groundwater Monitoring Records</b> Remarks_____	Readily available	Up to date	<input checked="" type="radio"/> N/A
8.	<b>Leachate Extraction Records</b> Remarks_____	Readily available	Up to date	<input checked="" type="radio"/> N/A
9.	<b>Discharge Compliance Records</b> Air Water (effluent) Remarks_____	Readily available Readily available	Up to date Up to date	<input checked="" type="radio"/> N/A <input checked="" type="radio"/> N/A
10.	<b>Daily Access/Security Logs</b> Remarks_____	Readily available	Up to date	<input checked="" type="radio"/> N/A

<b>IV. O&amp;M COSTS: Not reviewed during visit</b>																																											
1.	<b>O&amp;M Organization</b>	State in-house Contractor for State PRP in-house Contractor for PRP Federal Facility in-house Contractor for Federal Facility Other _____																																									
2.	<b>O&amp;M Cost Records</b>	Readily available Up to date Funding mechanism/agreement in place Original O&M cost estimate _____ Breakdown attached  Total annual cost by year for review period if available  <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">From _____</td> <td style="width: 10%;">To _____</td> <td style="width: 20%;"></td> <td style="width: 10%;">Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> </table>		From _____	To _____		Breakdown attached	Date	Date	Total cost		From _____	To _____		Breakdown attached	Date	Date	Total cost		From _____	To _____		Breakdown attached	Date	Date	Total cost		From _____	To _____		Breakdown attached	Date	Date	Total cost		From _____	To _____		Breakdown attached	Date	Date	Total cost	
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Date	Date	Total cost																																									
3.	<b>Unanticipated or Unusually High O&amp;M Costs During Review Period</b> Describe costs and reasons: _____ _____ _____ _____ _____ _____																																										
<b>V. ACCESS AND INSTITUTIONAL CONTROLS</b>																																											
<div style="border: 1px solid black; border-radius: 50%; padding: 2px 10px; display: inline-block;">Applicable</div> N/A																																											
<b>A. Fencing</b>																																											
1.	<b>Fencing damaged</b> Remarks: <i>The area was not encircled with fencing.</i>	Location shown on site map Gates secured	<div style="border: 1px solid black; border-radius: 50%; padding: 2px 10px; display: inline-block;">N/A</div>																																								
<b>B. Other Access Restrictions</b>																																											
1.	<b>Signs and other security measures</b> Remarks: <i>Base-wide access is restricted, but once inside the Base, access to this LUC is not restricted.</i>	Location shown on site map	<div style="border: 1px solid black; border-radius: 50%; padding: 2px 10px; display: inline-block;">N/A</div>																																								

<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b>		
	Site conditions imply ICs not properly implemented	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Site conditions imply ICs not being fully enforced	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Type of monitoring (e.g., self-reporting, drive by)	Visual inspection – site walk	
	Frequency	Annual	
	Responsible party/agency	U.S. Department of the Navy, Great Lakes Naval Training Center	
	Contact	Benjamin Simes	Project Manager
		9/20/12	415-828-9326
		Name	Title
		Date	Phone no.
	Reporting is up-to-date	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Reports are verified by the lead agency	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Specific requirements in deed or decision documents have been met	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Violations have been reported	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Other problems or suggestions:	Report attached	
	Annual inspections are taking place. Documentation of inspections, verification that inspection results have been supplied to the IEPA and U.S. EPA, and documentation of corrective measures taken to address deficiencies (if applicable) were available for 2009 through 2011.		
2.	<b>Adequacy</b>	ICs are adequate <input checked="" type="radio"/> ICs are inadequate <input type="radio"/>	N/A
	Remarks: The institutional controls are adequately protective of human health and the environment when coupled with a properly maintained landfill.		
<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	Location shown on site map	No vandalism evident <input checked="" type="radio"/>
	Remarks _____		
2.	<b>Land use changes on site</b>	N/A <input checked="" type="radio"/>	
	Remarks _____		
3.	<b>Land use changes off site</b>	N/A <input checked="" type="radio"/>	
	Remarks _____		
<b>VI. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b>	Applicable <input checked="" type="radio"/>	N/A	
1.	<b>Roads damaged</b>	Location shown on site map	Roads adequate <input checked="" type="radio"/> N/A
	Remarks _____		

<b>B. Other Site Conditions</b>			
Remarks: There was a bare patch with no vegetation. The area was approximately 100 ft <sup>2</sup> in area, and was located on the west side of the landfill.			
<b>VII. LANDFILL COVERS</b>		Applicable	N/A
<b>A. Landfill Surface</b>			
1.	<b>Settlement</b> (Low spots) Areal extent _____ Depth _____ Remarks: _____	Location shown on site map _____	Settlement not evident
2.	<b>Cracks</b> Lengths _____ Widths _____ Depths _____ Remarks: _____	Location shown on site map _____	Cracking not evident
3.	<b>Erosion</b> Areal extent _____ Depth _____ Remarks: _____	Location shown on site map _____	Erosion not evident
4.	<b>Holes</b> Areal extent _____ Depth _____ Remarks: _____	Location shown on site map _____	Holes not evident
5.	<b>Vegetative Cover</b> Grass _____ Trees/Shrubs (indicate size and locations on a diagram) Remarks: There was a bare patch with no vegetation. The area was approximately 100 ft <sup>2</sup> in area, and was located on the west side of the landfill. In all other areas there was good ground cover.	Cover properly established	No signs of stress
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> Remarks: _____	N/A	
7.	<b>Bulges</b> Areal extent _____ Height _____ Remarks: _____	Location shown on site map _____	Bulges not evident
8.	<b>Wet Areas/Water Damage</b> Wet areas _____ Ponding _____ Seeps _____ Soft subgrade _____ Remarks: _____	Wet areas/water damage not evident Location shown on site map _____ Location shown on site map _____ Location shown on site map _____ Location shown on site map _____	Areal extent _____ Areal extent _____ Areal extent _____ Areal extent _____
9.	<b>Slope Instability</b> Slides _____ Areal extent _____ Remarks: _____	Location shown on site map _____	No evidence of slope instability

<b>B. Benches</b>		Applicable	N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	<b>Flows Bypass Bench</b>	Location shown on site map	N/A or okay
Remarks_____			
2.	<b>Bench Breached</b>	Location shown on site map	N/A or okay
Remarks_____			
3.	<b>Bench Overtopped</b>	Location shown on site map	N/A or okay
Remarks_____			
<b>C. Letdown Channels</b>		Applicable	N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1.	<b>Settlement</b>	Location shown on site map	No evidence of settlement
Areal extent_____		Depth_____	
Remarks_____			
2.	<b>Material Degradation</b>	Location shown on site map	No evidence of degradation
Material type_____		Areal extent_____	
Remarks_____			
3.	<b>Erosion</b>	Location shown on site map	No evidence of erosion
Areal extent_____		Depth_____	
Remarks_____			

4.	<b>Undercutting</b>	Location shown on site map	No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____		
5.	<b>Obstructions</b>	Type _____	No obstructions
	Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____		
6.	<b>Excessive Vegetative Growth</b>	Type _____	
	No evidence of excessive growth		
	Vegetation in channels does not obstruct flow		
	Location shown on site map	Areal extent _____	
	Remarks _____		
<b>D. Cover Penetrations</b> Applicable      N/A			
1.	<b>Gas Vents</b>	Active <input type="radio"/> <input checked="" type="radio"/> Passive	
	Properly secured/locked	Functioning	Routinely sampled      Good condition
	Evidence of leakage at penetration		Needs Maintenance
	N/A		
	Remarks: The second and fourth vents away from the gate were not turning. They should be checked to make sure they remain functional.		
2.	<b>Gas Monitoring Probes</b>	Properly secured/locked      Functioning	Routinely sampled <input checked="" type="radio"/> Good condition
	Evidence of leakage at penetration		Needs Maintenance      N/A
	Remarks _____		
3.	<b>Monitoring Wells</b> (within surface area of landfill)	Properly secured/locked      Functioning	Routinely sampled <input checked="" type="radio"/> Good condition
	Evidence of leakage at penetration		Needs Maintenance      N/A
	Remarks _____		
4.	<b>Leachate Extraction Wells</b>	Properly secured/locked      Functioning	Routinely sampled      Good condition
	Evidence of leakage at penetration		Needs Maintenance <input checked="" type="radio"/> N/A
	Remarks _____		
5.	<b>Settlement Monuments</b>	Located	Routinely surveyed <input checked="" type="radio"/> N/A
	Remarks _____		

<b>E. Gas Collection and Treatment</b>		Applicable	N/A
1.	<b>Gas Treatment Facilities</b> Flaring                      Thermal destruction                      Collection for reuse Good condition   Needs Maintenance Remarks _____ _____		
2.	<b>Gas Collection Wells, Manifolds and Piping</b> Good condition   Needs Maintenance Remarks _____ _____		
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings) Good condition   Needs Maintenance                      N/A Remarks _____ _____		
<b>F. Cover Drainage Layer</b>		Applicable	N/A
1.	<b>Outlet Pipes Inspected</b> Functioning                      N/A Remarks _____ _____		
2.	<b>Outlet Rock Inspected</b> Functioning                      N/A Remarks _____ _____		
<b>G. Detention/Sedimentation Ponds</b>		Applicable	N/A
1.	<b>Siltation</b> Areal extent _____                      Depth _____                      N/A Siltation not evident Remarks _____ _____		
2.	<b>Erosion</b> Areal extent _____                      Depth _____ Erosion not evident Remarks _____ _____		
3.	<b>Outlet Works</b> Functioning                      N/A Remarks _____ _____		
4.	<b>Dam</b> Functioning                      N/A Remarks _____ _____		

<b>H. Retaining Walls</b>		Applicable	N/A
1.	<b>Deformations</b>	Location shown on site map	Deformation not evident
	Horizontal displacement_____	Vertical displacement_____	
	Rotational displacement_____		
	Remarks_____		
2.	<b>Degradation</b>	Location shown on site map	Degradation not evident
	Remarks_____		
<b>I. Perimeter Ditches/Off-Site Discharge</b>		Applicable	N/A
1.	<b>Siltation</b>	Location shown on site map	Siltation not evident
	Areal extent_____	Depth_____	
	Remarks_____		
2.	<b>Vegetative Growth</b>	Location shown on site map	N/A
	Vegetation does not impede flow		
	Areal extent_____	Type_____	
	Remarks_____		
3.	<b>Erosion</b>	Location shown on site map	Erosion not evident
	Areal extent_____	Depth_____	
	Remarks_____		
4.	<b>Discharge Structure</b>	Functioning	N/A
	Remarks_____		
<b>VIII. VERTICAL BARRIER WALLS</b>		Applicable	N/A
1.	<b>Settlement</b>	Location shown on site map	Settlement not evident
	Areal extent_____	Depth_____	
	Remarks_____		
2.	<b>Performance Monitoring</b>	Type of monitoring_____	
	Performance not monitored		
	Frequency_____	Evidence of breaching	
	Head differential_____		
	Remarks_____		

<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		Applicable	N/A
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Pumps, Wellhead Plumbing, and Electrical</b> Good condition   All required wells properly operating   Needs Maintenance   N/A Remarks _____ _____ _____		
2.	<b>Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available   Good condition   Requires upgrade   Needs to be provided Remarks _____ _____ _____		
<b>B. Surface Water Collection Structures, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Collection Structures, Pumps, and Electrical</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
2.	<b>Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available   Good condition   Requires upgrade   Needs to be provided Remarks _____ _____ _____		

C. Treatment System		Applicable	N/A
1.	<b>Treatment Train</b> (Check components that apply) Metals removal                      Oil/water separation                      Bioremediation Air stripping                                      Carbon adsorbers Filters _____ Additive (e.g., chelation agent, flocculent) _____ Others _____ Good condition                      Needs Maintenance Sampling ports properly marked and functional Sampling/maintenance log displayed and up to date Equipment properly identified Quantity of groundwater treated annually _____ Quantity of surface water treated annually _____ Remarks _____ _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) N/A                      Good condition                      Needs Maintenance Remarks _____ _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> N/A                      Good condition                      Proper secondary containment                      Needs Maintenance Remarks _____ _____		
4.	<b>Discharge Structure and Appurtenances</b> N/A                      Good condition                      Needs Maintenance Remarks _____ _____		
5.	<b>Treatment Building(s)</b> N/A                      Good condition (esp. roof and doorways)                      Needs repair Chemicals and equipment properly stored Remarks _____ _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy) Properly secured/locked                      Functioning                      Routinely sampled                      Good condition All required wells located                      Needs Maintenance                      N/A Remarks _____ _____		
<b>D. Monitoring Data</b>			
1.	Monitoring Data Is routinely submitted on time                      Is of acceptable quality		
2.	Monitoring data suggests: Groundwater plume is effectively contained                      Contaminant concentrations are declining		

<b>D. Monitored Natural Attenuation</b>				
1.	<b>Monitoring Wells</b> (natural attenuation remedy)			
	Properly secured/locked	Functioning	Routinely sampled	Good condition
	All required wells located	Needs Maintenance		N/A
	Remarks _____			
<b>X. OTHER REMEDIES</b>				
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.				
<b>XI. OVERALL OBSERVATIONS</b>				
<b>A. Implementation of the Remedy</b>				
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.). <i>The remedy is intended to restrict reuse of the site to light recreational land use, prevent exposure to landfill refuse, and prohibit groundwater use on a base-wide level. The remedy is effective. Land use has not changed. Overall, the landfill cover is in good condition with the exception of a 100 ft<sup>2</sup> area on the west side of the landfill.</i>				
<b>B. Adequacy of O&amp;M</b>				
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.				
_____				
_____				
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<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>
<p>Describe issues and observations such as unexpected changes in the cost or scope of O&amp;M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
<b>D.</b>	<b>Opportunities for Optimization</b>
<p>Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>None observed</u></p>	

Please note that “O&M” is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as “system operations” since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

## Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. “N/A” refers to “not applicable.”)

I. SITE INFORMATION	
<b>Site name:</b> Site 1 – Golf Course Landfill	<b>Date of inspection:</b> September 20, 2012
<b>Location and Region:</b> Naval Station Great Lakes, Region V	<b>EPA ID:</b> 7170024577
<b>Agency, office, or company leading the five-year review:</b> Navy	<b>Weather/temperature:</b> Sunny, Average Temp = 58°F
<b>Remedy Includes:</b> (Check all that apply) <div style="display: flex; justify-content: space-between;"> <div> Landfill cover/containment  Access controls  Institutional controls  Groundwater pump and treatment  Surface water collection and treatment  Other: <i>The remedy included a soil cover constructed as a golf course over the former trench and burn landfill, as well as LUCs to prohibit soil disturbance and groundwater use.</i> </div> <div> Monitored natural attenuation  Groundwater containment  Vertical barrier walls </div> </div>	
<b>Attachments:</b> Site photos included.	
II. INTERVIEWS (Check all that apply)	
1. <b>O&amp;M site manager</b> <u>Benjamin Simes</u> <u>Project Manager</u> <u>9/20/2012</u> <div style="display: flex; justify-content: space-between;"> <div>Name</div> <div>Title</div> <div>Date</div> </div> Interviewed <u>at site</u> at office by phone      Phone no.: 415-828-9326 Problems, suggestions; Report attached _____ _____	
2. <b>O&amp;M staff</b> _____ <div style="display: flex; justify-content: space-between;"> <div>Name</div> <div>Title</div> <div>Date</div> </div> Interviewed at site at office by phone      Phone no. _____ Problems, suggestions; Report attached _____ _____	



<b>III. ON-SITE DOCUMENTS &amp; RECORDS VERIFIED</b> (Check all that apply)				
1.	<b>O&amp;M Documents</b> O&M manual As-built drawings Maintenance logs Remarks_____	Readily available Readily available Readily available	Up to date Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A <input type="radio"/> N/A
2.	<b>Site-Specific Health and Safety Plan</b> Contingency plan/emergency response plan Remarks_____	Readily available Readily available	Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A
3.	<b>O&amp;M and OSHA Training Records</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A
4.	<b>Permits and Service Agreements</b> Air discharge permit Effluent discharge Waste disposal, POTW Other permits_____ Remarks_____	Readily available Readily available Readily available Readily available	Up to date Up to date Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A <input type="radio"/> N/A <input type="radio"/> N/A
5.	<b>Gas Generation Records</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A
6.	<b>Settlement Monument Records</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A
7.	<b>Groundwater Monitoring Records</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A
8.	<b>Leachate Extraction Records</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A
9.	<b>Discharge Compliance Records</b> Air Water (effluent) Remarks_____	Readily available Readily available	Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A
10.	<b>Daily Access/Security Logs</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A

<b>IV. O&amp;M COSTS: <i>Not reviewed during visit</i></b>																																											
1.	<b>O&amp;M Organization</b> State in-house _____ Contractor for State _____ PRP in-house _____ Contractor for PRP _____ Federal Facility in-house _____ Contractor for Federal Facility _____ Other _____ _____																																										
2.	<b>O&amp;M Cost Records</b> Readily available _____ Up to date _____ Funding mechanism/agreement in place _____ Original O&M cost estimate _____ Breakdown attached _____  <div style="text-align: center;">Total annual cost by year for review period if available</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">From _____</td> <td style="width: 10%;">To _____</td> <td style="width: 20%;">_____</td> <td style="width: 50%;">Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td>_____</td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td style="text-align: center;">Total cost</td> <td></td> </tr> </table>			From _____	To _____	_____	Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	Breakdown attached	Date	Date	Total cost		From _____	To _____	_____	Breakdown attached	Date	Date	Total cost	
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3.	<b>Unanticipated or Unusually High O&amp;M Costs During Review Period</b> Describe costs and reasons: _____ _____ _____ _____ _____ _____																																										
<b>V. ACCESS AND INSTITUTIONAL CONTROLS</b> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Applicable</span> N/A																																											
<b>A. Fencing</b>																																											
1.	<b>Fencing damaged</b> _____ Location shown on site map _____ Gates secured <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">N/A</span> Remarks: <i>No fencing is in place.</i>																																										
<b>B. Other Access Restrictions</b>																																											
1.	<b>Signs and other security measures</b> _____ Location shown on site map <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">N/A</span> Remarks: <i>Site access is unrestricted, and the golf course is open to the public.</i>																																										

C. Institutional Controls (ICs)			
1.	<b>Implementation and enforcement</b>		
	Site conditions imply ICs not properly implemented	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Site conditions imply ICs not being fully enforced	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Type of monitoring (e.g., self-reporting, drive by)	Visual inspection – site walk	
	Frequency	Annual	
	Responsible party/agency	U.S. Department of the Navy, Great Lakes Naval Training Center	
	Contact	Benjamin Simes	Project Manager
			9/20/12 415-828-9326
		Name	Title
			Date Phone no.
	Reporting is up-to-date	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Reports are verified by the lead agency	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Specific requirements in deed or decision documents have been met	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Violations have been reported	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Other problems or suggestions:	Report attached	
	Annual inspections are taking place. However, inspection reports or documentation were not available on NIRIS or other readily accessible source. Documentation of inspections, verification that inspection results have been supplied to the IEPA and U.S. EPA, and documentation of corrective measures taken to address deficiencies (if applicable) should be readily available.		
2.	<b>Adequacy</b>	ICs are adequate <input checked="" type="radio"/>	ICs are inadequate <input type="radio"/> N/A <input type="radio"/>
	Remarks: The institutional controls are adequately protective of human health and the environment when coupled with a properly maintained soil cover.		
D. General			
1.	<b>Vandalism/trespassing</b>	Location shown on site map	No vandalism evident <input checked="" type="radio"/>
	Remarks _____		
2.	<b>Land use changes on site</b>	N/A <input checked="" type="radio"/>	
	Remarks _____		
3.	<b>Land use changes off site</b>	N/A <input checked="" type="radio"/>	
	Remarks _____		
VI. GENERAL SITE CONDITIONS			
<b>A. Roads</b>	Applicable <input checked="" type="radio"/>	N/A <input type="radio"/>	
1.	<b>Roads damaged</b>	Location shown on site map	Roads adequate <input checked="" type="radio"/> N/A <input type="radio"/>
	Remarks _____		

<b>B. Other Site Conditions</b>		
Remarks: <i>The golf course was formerly a trench and burn landfill that was used to dispose of general refuse and sludge. The golf course vegetation was in good condition and there was no evidence of waste materials at the surface or erosion of soil.</i>		
<b>VII. LANDFILL COVERS</b> <u>Applicable</u> N/A		
<b>A. Landfill Surface</b>		
1.	<b>Settlement</b> (Low spots) Areal extent _____ Depth _____ Remarks _____	Location shown on site map _____ <u>Settlement not evident</u>
2.	<b>Cracks</b> Lengths _____ Widths _____ Depths _____ Remarks _____	Location shown on site map _____ <u>Cracking not evident</u>
3.	<b>Erosion</b> Areal extent _____ Depth _____ Remarks _____	Location shown on site map _____ <u>Erosion not evident</u>
4.	<b>Holes</b> Areal extent _____ Depth _____ Remarks _____	Location shown on site map _____ <u>Holes not evident</u>
5.	<b>Vegetative Cover</b> Grass    Cover properly established Trees/Shrubs (indicate size and locations on a diagram) Remarks _____	<u>No signs of stress</u>
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> Remarks _____	<u>N/A</u>
7.	<b>Bulges</b> Areal extent _____ Height _____ Remarks _____	Location shown on site map _____ <u>Bulges not evident</u>
8.	<b>Wet Areas/Water Damage</b> Wet areas _____ Ponding _____ Seeps _____ Soft subgrade _____ Remarks _____	<u>Wet areas/water damage not evident</u> Location shown on site map _____ Areal extent _____ Location shown on site map _____ Areal extent _____ Location shown on site map _____ Areal extent _____ Location shown on site map _____ Areal extent _____ <u>Skokie Creek and other ponds are present on golf course</u>

9.	<b>Slope Instability</b>	Slides	Location shown on site map	<u>No evidence of slope instability</u>
	Areal extent _____			
	Remarks _____			
<b>B. Benches</b>				
	Applicable	<u>N/A</u>		
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)				
1.	<b>Flows Bypass Bench</b>		Location shown on site map	N/A or okay
	Remarks _____			
2.	<b>Bench Breached</b>		Location shown on site map	N/A or okay
	Remarks _____			
3.	<b>Bench Overtopped</b>		Location shown on site map	N/A or okay
	Remarks _____			
<b>C. Letdown Channels</b>				
	Applicable	<u>N/A</u>		
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)				
1.	<b>Settlement</b>		Location shown on site map	No evidence of settlement
	Areal extent _____	Depth _____		
	Remarks _____			
2.	<b>Material Degradation</b>		Location shown on site map	No evidence of degradation
	Material type _____	Areal extent _____		
	Remarks _____			
3.	<b>Erosion</b>		Location shown on site map	No evidence of erosion
	Areal extent _____	Depth _____		
	Remarks _____			

4.	<b>Undercutting</b>	Location shown on site map	No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____		
5.	<b>Obstructions</b>	Type _____	No obstructions
	Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____		
6.	<b>Excessive Vegetative Growth</b>	Type _____	
	No evidence of excessive growth		
	Vegetation in channels does not obstruct flow		
	Location shown on site map	Areal extent _____	
	Remarks _____		
<b>D. Cover Penetrations</b> Applicable <u>N/A</u>			
1.	<b>Gas Vents</b>	Active    Passive	
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance
	N/A		
	Remarks _____		
2.	<b>Gas Monitoring Probes</b>		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance    N/A
	Remarks _____		
3.	<b>Monitoring Wells</b> (within surface area of landfill)		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance    N/A
	Remarks _____		
4.	<b>Leachate Extraction Wells</b>		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance    N/A
	Remarks _____		
5.	<b>Settlement Monuments</b>	Located	Routinely surveyed    N/A
	Remarks _____		

<b>E. Gas Collection and Treatment</b>		Applicable	N/A
1.	<b>Gas Treatment Facilities</b> Flaring                      Thermal destruction                      Collection for reuse Good condition   Needs Maintenance Remarks _____ _____		
2.	<b>Gas Collection Wells, Manifolds and Piping</b> Good condition   Needs Maintenance Remarks _____ _____		
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings) Good condition   Needs Maintenance                      N/A Remarks _____ _____		
<b>F. Cover Drainage Layer</b>		Applicable	N/A
1.	<b>Outlet Pipes Inspected</b> Functioning                      N/A Remarks _____ _____		
2.	<b>Outlet Rock Inspected</b> Functioning                      N/A Remarks _____ _____		
<b>G. Detention/Sedimentation Ponds</b>		Applicable	N/A
1.	<b>Siltation</b> Areal extent _____                      Depth _____                      N/A Siltation not evident Remarks _____ _____		
2.	<b>Erosion</b> Areal extent _____                      Depth _____ Erosion not evident Remarks _____ _____		
3.	<b>Outlet Works</b> Functioning                      N/A Remarks _____ _____		
4.	<b>Dam</b> Functioning                      N/A Remarks _____ _____		

<b>H. Retaining Walls</b>		Applicable	N/A
1.	<b>Deformations</b>	Location shown on site map	Deformation not evident
	Horizontal displacement_____	Vertical displacement_____	
	Rotational displacement_____		
	Remarks_____		
2.	<b>Degradation</b>	Location shown on site map	Degradation not evident
	Remarks_____		
<b>I. Perimeter Ditches/Off-Site Discharge</b>		Applicable	N/A
1.	<b>Siltation</b>	Location shown on site map	Siltation not evident
	Areal extent_____	Depth_____	
	Remarks_____		
2.	<b>Vegetative Growth</b>	Location shown on site map	N/A
	Vegetation does not impede flow		
	Areal extent_____	Type_____	
	Remarks_____		
3.	<b>Erosion</b>	Location shown on site map	Erosion not evident
	Areal extent_____	Depth_____	
	Remarks_____		
4.	<b>Discharge Structure</b>	Functioning	N/A
	Remarks_____		
<b>VIII. VERTICAL BARRIER WALLS</b>		Applicable	N/A
1.	<b>Settlement</b>	Location shown on site map	Settlement not evident
	Areal extent_____	Depth_____	
	Remarks_____		
2.	<b>Performance Monitoring</b>	Type of monitoring_____	
	Performance not monitored		
	Frequency_____	Evidence of breaching	
	Head differential_____		
	Remarks_____		

<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		Applicable	N/A
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Pumps, Wellhead Plumbing, and Electrical</b> Good condition   All required wells properly operating   Needs Maintenance   N/A Remarks _____ _____ _____		
2.	<b>Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available   Good condition   Requires upgrade   Needs to be provided Remarks _____ _____ _____		
<b>B. Surface Water Collection Structures, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Collection Structures, Pumps, and Electrical</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
2.	<b>Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available   Good condition   Requires upgrade   Needs to be provided Remarks _____ _____ _____		

C. Treatment System		Applicable	N/A
1.	<b>Treatment Train</b> (Check components that apply) Metals removal                      Oil/water separation                      Bioremediation Air stripping                                      Carbon adsorbers Filters _____ Additive (e.g., chelation agent, flocculent) _____ Others _____ Good condition                      Needs Maintenance Sampling ports properly marked and functional Sampling/maintenance log displayed and up to date Equipment properly identified Quantity of groundwater treated annually _____ Quantity of surface water treated annually _____ Remarks _____ _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) N/A                      Good condition                      Needs Maintenance Remarks _____ _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> N/A                      Good condition                      Proper secondary containment                      Needs Maintenance Remarks _____ _____		
4.	<b>Discharge Structure and Appurtenances</b> N/A                      Good condition                      Needs Maintenance Remarks _____ _____		
5.	<b>Treatment Building(s)</b> N/A                      Good condition (esp. roof and doorways)                      Needs repair Chemicals and equipment properly stored Remarks _____ _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy) Properly secured/locked                      Functioning                      Routinely sampled                      Good condition All required wells located                      Needs Maintenance                      N/A Remarks _____ _____		
<b>D. Monitoring Data</b>			
1.	Monitoring Data Is routinely submitted on time                      Is of acceptable quality		
2.	Monitoring data suggests: Groundwater plume is effectively contained                      Contaminant concentrations are declining		

<b>D. Monitored Natural Attenuation</b>			
1.	<b>Monitoring Wells</b> (natural attenuation remedy)		
	Properly secured/locked	Functioning	Routinely sampled
	All required wells located	Needs Maintenance	Good condition
	Remarks		N/A
<b>X. OTHER REMEDIES</b>			
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.			
<b>XI. OVERALL OBSERVATIONS</b>			
<b>A. Implementation of the Remedy</b>			
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).			
<u>The remedy is intended to restrict reuse of the site to industrial/commercial land use, prevent exposure to contaminated soil left in place, and prohibit groundwater use on a base-wide level. The remedy is effective. Land use has not changed, the cover material is intact and continues to prevent exposure to contaminated soil, and no wells have been installed at this site.</u>			
<b>B. Adequacy of O&amp;M</b>			
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.			

<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>
<p>Describe issues and observations such as unexpected changes in the cost or scope of O&amp;M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.</p>	
<p><u>No observations or issues that may cause a higher frequency of repairs or maintenance noted.</u></p>	
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<b>D.</b>	<b>Opportunities for Optimization</b>
<p>Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.</p>	
<p><u>None observed</u></p>	

Please note that “O&M” is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as “system operations” since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

## Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. “N/A” refers to “not applicable.”)

I. SITE INFORMATION	
<b>Site name:</b> Site 4 – Fire Fighting Training Area	<b>Date of inspection:</b> September 20, 2012
<b>Location and Region:</b> Naval Station Great Lakes, Region V	<b>EPA ID:</b> 7170024577
<b>Agency, office, or company leading the five-year review:</b> Navy	<b>Weather/temperature:</b> Sunny, Average Temp = 58°F
<b>Remedy Includes:</b> (Check all that apply) <div style="display: flex; justify-content: space-between;"> <div> Landfill cover/containment  Access controls  Institutional controls  Groundwater pump and treatment  Surface water collection and treatment  Other: <i>The remedy includes an engineered barrier comprised of a soil and asphalt pavement cover, as well as LUCs to prohibit soil disturbance and groundwater use.</i> </div> <div> Monitored natural attenuation  Groundwater containment  Vertical barrier walls </div> </div>	
<b>Attachments:</b> Site photos included.	
II. INTERVIEWS (Check all that apply)	
1. <b>O&amp;M site manager</b> <u>Benjamin Simes</u> <u>Project Manager</u> <u>9/20/2012</u> <div style="display: flex; justify-content: space-between;"> <div>Name</div> <div>Title</div> <div>Date</div> </div> Interviewed <u>at site</u> at office by phone      Phone no.: 415-828-9326 Problems, suggestions; Report attached _____ _____	
2. <b>O&amp;M staff</b> _____ <div style="display: flex; justify-content: space-between;"> <div>Name</div> <div>Title</div> <div>Date</div> </div> Interviewed at site at office by phone      Phone no. _____ Problems, suggestions; Report attached _____ _____	



<b>III. ON-SITE DOCUMENTS &amp; RECORDS VERIFIED</b> (Check all that apply)				
1.	<b>O&amp;M Documents</b> O&M manual As-built drawings Maintenance logs Remarks_____	Readily available Readily available Readily available	Up to date Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A <input type="radio"/> N/A
2.	<b>Site-Specific Health and Safety Plan</b> Contingency plan/emergency response plan Remarks_____	Readily available Readily available	Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A
3.	<b>O&amp;M and OSHA Training Records</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A
4.	<b>Permits and Service Agreements</b> Air discharge permit Effluent discharge Waste disposal, POTW Other permits_____ Remarks_____	Readily available Readily available Readily available Readily available	Up to date Up to date Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A <input type="radio"/> N/A <input type="radio"/> N/A
5.	<b>Gas Generation Records</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A
6.	<b>Settlement Monument Records</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A
7.	<b>Groundwater Monitoring Records</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A
8.	<b>Leachate Extraction Records</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A
9.	<b>Discharge Compliance Records</b> Air Water (effluent) Remarks_____	Readily available Readily available	Up to date Up to date	<input type="radio"/> N/A <input type="radio"/> N/A
10.	<b>Daily Access/Security Logs</b> Remarks_____	Readily available	Up to date	<input type="radio"/> N/A

<b>IV. O&amp;M COSTS: <i>Not reviewed during visit</i></b>																																																															
1.	<b>O&amp;M Organization</b> <div style="display: flex; justify-content: space-between;"> <div>State in-house</div> <div>Contractor for State</div> </div> <div style="display: flex; justify-content: space-between;"> <div>PRP in-house</div> <div>Contractor for PRP</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Federal Facility in-house</div> <div>Contractor for Federal Facility</div> </div> <div>Other _____</div>																																																														
2.	<b>O&amp;M Cost Records</b> <div style="display: flex; justify-content: space-between;"> <div>Readily available</div> <div>Up to date</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Funding mechanism/agreement in place</div> <div></div> </div> <div>Original O&amp;M cost estimate _____ Breakdown attached</div> <div style="text-align: center;">Total annual cost by year for review period if available</div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">From _____</td> <td style="width: 10%;">To _____</td> <td style="width: 20%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 25%;">Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td></td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td></td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td></td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td></td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> </tr> <tr> <td>From _____</td> <td>To _____</td> <td></td> <td></td> <td></td> <td>Breakdown attached</td> </tr> <tr> <td style="text-align: center;">Date</td> <td style="text-align: center;">Date</td> <td></td> <td style="text-align: center;">Total cost</td> <td></td> <td></td> </tr> </table>			From _____	To _____				Breakdown attached	Date	Date		Total cost			From _____	To _____				Breakdown attached	Date	Date		Total cost			From _____	To _____				Breakdown attached	Date	Date		Total cost			From _____	To _____				Breakdown attached	Date	Date		Total cost			From _____	To _____				Breakdown attached	Date	Date		Total cost		
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3.	<b>Unanticipated or Unusually High O&amp;M Costs During Review Period</b> Describe costs and reasons: _____ _____ _____ _____ _____ _____																																																														
<b>V. ACCESS AND INSTITUTIONAL CONTROLS</b>																																																															
<div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; display: inline-block;">Applicable</div> N/A																																																															
<b>A. Fencing</b>																																																															
1.	<b>Fencing damaged</b> Location shown on site map      Gates secured <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; display: inline-block;">N/A</div> Remarks: <i>No fencing is in place.</i>																																																														
<b>B. Other Access Restrictions</b>																																																															
1.	<b>Signs and other security measures</b> Location shown on site map <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; display: inline-block;">N/A</div> Remarks: <i>Site access is unrestricted, and the golf course is open to the public.</i>																																																														

<b>C. Institutional Controls (ICs)</b>			
1.	<b>Implementation and enforcement</b>		
	Site conditions imply ICs not properly implemented	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Site conditions imply ICs not being fully enforced	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Type of monitoring (e.g., self-reporting, drive by)	Visual inspection – site walk	
	Frequency	Annual	
	Responsible party/agency	U.S. Department of the Navy, Great Lakes Naval Training Center	
	Contact	Benjamin Simes	Project Manager
			9/20/12 415-828-9326
		Name	Title
			Date Phone no.
	Reporting is up-to-date	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Reports are verified by the lead agency	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Specific requirements in deed or decision documents have been met	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Violations have been reported	Yes <input type="radio"/> No <input type="radio"/>	N/A
	Other problems or suggestions:	Report attached	
	Annual inspections are taking place. However, inspection reports or documentation were not available on NIRIS or other readily accessible source. Documentation of inspections, verification that inspection results have been supplied to the IEPA and U.S. EPA, and documentation of corrective measures taken to address deficiencies (if applicable) should be readily available.		
2.	<b>Adequacy</b>	ICs are adequate <input checked="" type="radio"/>	ICs are inadequate <input type="radio"/> N/A <input type="radio"/>
	Remarks: The institutional controls are adequately protective of human health and the environment when coupled with a properly maintained cover.		
<b>D. General</b>			
1.	<b>Vandalism/trespassing</b>	Location shown on site map	No vandalism evident <input checked="" type="radio"/>
	Remarks _____		
2.	<b>Land use changes on site</b>	N/A <input checked="" type="radio"/>	
	Remarks _____		
3.	<b>Land use changes off site</b>	N/A <input checked="" type="radio"/>	
	Remarks _____		
<b>VI. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b>	Applicable <input checked="" type="radio"/>	N/A <input type="radio"/>	
1.	<b>Roads damaged</b>	Location shown on site map	Roads adequate <input checked="" type="radio"/> N/A <input type="radio"/>
	Remarks _____		

<b>B. Other Site Conditions</b>			
Remarks: <i>The golf course maintenance area was formerly a fire training area that was used to train firefighting personnel. The site vegetation was in good condition and there was no evidence of waste materials at the surface or erosion of soil. Pavement was generally in good condition.</i>			
<b>VII. LANDFILL COVERS</b> Applicable <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">N/A</span>			
<b>A. Landfill Surface</b>			
1.	<b>Settlement</b> (Low spots) Areal extent _____ Depth _____ Remarks _____	Location shown on site map Depth _____	Settlement not evident
2.	<b>Cracks</b> Lengths _____ Remarks _____	Widths _____ Depths _____ Location shown on site map	Cracking not evident
3.	<b>Erosion</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	Erosion not evident
4.	<b>Holes</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	Holes not evident
5.	<b>Vegetative Cover</b> Grass _____ Trees/Shrubs (indicate size and locations on a diagram) Remarks _____	Cover properly established	No signs of stress
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> Remarks _____	N/A	
7.	<b>Bulges</b> Areal extent _____ Remarks _____	Location shown on site map Height _____	Bulges not evident
8.	<b>Wet Areas/Water Damage</b> Wet areas _____ Ponding _____ Seeps _____ Soft subgrade _____ Remarks _____	Wet areas/water damage not evident Location shown on site map Location shown on site map Location shown on site map Location shown on site map	Areal extent _____ Areal extent _____ Areal extent _____ Areal extent _____

9.	<b>Slope Instability</b>	Slides	Location shown on site map	No evidence of slope instability
	Areal extent_____			
	Remarks_____			
	_____			
<b>B. Benches</b> Applicable                      N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)				
1.	<b>Flows Bypass Bench</b>		Location shown on site map	N/A or okay
	Remarks_____			
	_____			
2.	<b>Bench Breached</b>		Location shown on site map	N/A or okay
	Remarks_____			
	_____			
3.	<b>Bench Overtopped</b>		Location shown on site map	N/A or okay
	Remarks_____			
	_____			
<b>C. Letdown Channels</b> Applicable                      N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)				
1.	<b>Settlement</b>		Location shown on site map	No evidence of settlement
	Areal extent_____		Depth_____	
	Remarks_____			
	_____			
2.	<b>Material Degradation</b>		Location shown on site map	No evidence of degradation
	Material type_____		Areal extent_____	
	Remarks_____			
	_____			
3.	<b>Erosion</b>		Location shown on site map	No evidence of erosion
	Areal extent_____		Depth_____	
	Remarks_____			
	_____			

4.	<b>Undercutting</b>	Location shown on site map	No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____		
5.	<b>Obstructions</b>	Type _____	No obstructions
	Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____		
6.	<b>Excessive Vegetative Growth</b>	Type _____	
	No evidence of excessive growth		
	Vegetation in channels does not obstruct flow		
	Location shown on site map	Areal extent _____	
	Remarks _____		
<b>D. Cover Penetrations</b> Applicable    N/A			
1.	<b>Gas Vents</b>	Active    Passive	
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance
	N/A		
	Remarks _____		
2.	<b>Gas Monitoring Probes</b>		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance    N/A
	Remarks _____		
3.	<b>Monitoring Wells</b> (within surface area of landfill)		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance    N/A
	Remarks _____		
4.	<b>Leachate Extraction Wells</b>		
	Properly secured/locked	Functioning	Routinely sampled    Good condition
	Evidence of leakage at penetration		Needs Maintenance    N/A
	Remarks _____		
5.	<b>Settlement Monuments</b>	Located	Routinely surveyed    N/A
	Remarks _____		

<b>E. Gas Collection and Treatment</b>		Applicable	N/A
1.	<b>Gas Treatment Facilities</b> Flaring                      Thermal destruction                      Collection for reuse Good condition   Needs Maintenance Remarks _____ _____		
2.	<b>Gas Collection Wells, Manifolds and Piping</b> Good condition   Needs Maintenance Remarks _____ _____		
3.	<b>Gas Monitoring Facilities</b> ( <i>e.g.</i> , gas monitoring of adjacent homes or buildings) Good condition   Needs Maintenance                      N/A Remarks _____ _____		
<b>F. Cover Drainage Layer</b>		Applicable	N/A
1.	<b>Outlet Pipes Inspected</b> Functioning                      N/A Remarks _____ _____		
2.	<b>Outlet Rock Inspected</b> Functioning                      N/A Remarks _____ _____		
<b>G. Detention/Sedimentation Ponds</b>		Applicable	N/A
1.	<b>Siltation</b> Areal extent _____                      Depth _____                      N/A Siltation not evident Remarks _____ _____		
2.	<b>Erosion</b> Areal extent _____                      Depth _____ Erosion not evident Remarks _____ _____		
3.	<b>Outlet Works</b> Functioning                      N/A Remarks _____ _____		
4.	<b>Dam</b> Functioning                      N/A Remarks _____ _____		

<b>H. Retaining Walls</b>		Applicable	N/A
1.	<b>Deformations</b> Horizontal displacement _____ Rotational displacement _____ Remarks _____	Location shown on site map	Deformation not evident Vertical displacement _____
2.	<b>Degradation</b> Remarks _____	Location shown on site map	Degradation not evident
<b>I. Perimeter Ditches/Off-Site Discharge</b>		Applicable	N/A
1.	<b>Siltation</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	Siltation not evident
2.	<b>Vegetative Growth</b> Vegetation does not impede flow Areal extent _____ Remarks _____	Location shown on site map Type _____	N/A
3.	<b>Erosion</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	Erosion not evident
4.	<b>Discharge Structure</b> Remarks _____	Functioning	N/A
<b>VIII. VERTICAL BARRIER WALLS</b>		Applicable	N/A
1.	<b>Settlement</b> Areal extent _____ Remarks _____	Location shown on site map Depth _____	Settlement not evident
2.	<b>Performance Monitoring</b> Performance not monitored Frequency _____ Head differential _____ Remarks _____	Type of monitoring _____ Evidence of breaching	

<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		Applicable	N/A
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Pumps, Wellhead Plumbing, and Electrical</b> Good condition   All required wells properly operating   Needs Maintenance   N/A Remarks _____ _____ _____		
2.	<b>Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available   Good condition   Requires upgrade   Needs to be provided Remarks _____ _____ _____		
<b>B. Surface Water Collection Structures, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Collection Structures, Pumps, and Electrical</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
2.	<b>Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition   Needs Maintenance Remarks _____ _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available   Good condition   Requires upgrade   Needs to be provided Remarks _____ _____ _____		

C. Treatment System		Applicable	N/A
1.	<b>Treatment Train</b> (Check components that apply) Metals removal                      Oil/water separation                      Bioremediation Air stripping                                      Carbon adsorbers Filters _____ Additive (e.g., chelation agent, flocculent) _____ Others _____ Good condition                      Needs Maintenance Sampling ports properly marked and functional Sampling/maintenance log displayed and up to date Equipment properly identified Quantity of groundwater treated annually _____ Quantity of surface water treated annually _____ Remarks _____ _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) N/A                      Good condition                      Needs Maintenance Remarks _____ _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> N/A                      Good condition                      Proper secondary containment                      Needs Maintenance Remarks _____ _____		
4.	<b>Discharge Structure and Appurtenances</b> N/A                      Good condition                      Needs Maintenance Remarks _____ _____		
5.	<b>Treatment Building(s)</b> N/A                      Good condition (esp. roof and doorways)                      Needs repair Chemicals and equipment properly stored Remarks _____ _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy) Properly secured/locked                      Functioning                      Routinely sampled                      Good condition All required wells located                      Needs Maintenance                      N/A Remarks _____ _____		
<b>D. Monitoring Data</b>			
1.	Monitoring Data Is routinely submitted on time                      Is of acceptable quality		
2.	Monitoring data suggests: Groundwater plume is effectively contained                      Contaminant concentrations are declining		

<b>D. Monitored Natural Attenuation</b>			
1.	<b>Monitoring Wells</b> (natural attenuation remedy)		
	Properly secured/locked	Functioning	Routinely sampled
	All required wells located	Needs Maintenance	Good condition
	Remarks		N/A
<b>X. OTHER REMEDIES</b>			
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.			
<b>XI. OVERALL OBSERVATIONS</b>			
<b>A. Implementation of the Remedy</b>			
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).			
<u>The remedy is intended to restrict reuse of the site to industrial/commercial land use, prevent exposure to contaminated soil left in place, and prohibit groundwater use on a base-wide level. The remedy is effective. Land use has not changed, the cover material is intact and continues to prevent exposure to contaminated soil, and no wells have been installed at this site.</u>			
<b>B. Adequacy of O&amp;M</b>			
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.			

<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.	
<u>No observations or issues that may cause a higher frequency of repairs or maintenance noted.</u>	
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<b>D.</b>	<b>Opportunities for Optimization</b>
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.	
<u>None observed</u>	

## **2013 Site Inspection Forms**



## LUC TRACKER REPORT

### LAND USE CONTROL INSPECTION SHEET

COMMAND: MIDWEST

Remedial Project Manager: Van Donsel, Terese

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Event: LUC 11 - Site 22 Oct 2013

#### Site Information

Base: GREAT\_LAKES\_NSTC  
NORM Site ID: SITE 00022  
Installation / Activity: SITE 00022  
Type of Site: ERN  
Ownership: U.S. Navy  
Inspection Date: Aug 15, 2013 10:18:51 AM  
Inspector:

Remedial Action Objective	LUC	Implementation
A landfill cover at the site prevents exposure to contaminated soil and reduces infiltration of groundwater. This cover will be inspected and maintained.; Groundwater use restricted; Prohibits disturbance of surface or subsurface soil, unless prior written approval of the Navy and lead regulatory agency is obtained.; Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.	LNDFLL_COVER_MNT; GROUNDWATER; SOIL_DISTURBANCE; NON-RESIDENTIAL	ANNUAL CERTIFICA
Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.	NON-RESIDENTIAL	EXPOSURE BARRIER

Prohibits disturbance of surface or subsurface soil, unless prior written approval of the Navy and lead regulatory agency is obtained.; Groundwater use restricted; Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.; A landfill cover at the site prevents exposure to contaminated soil and reduces infiltration of groundwater. This cover will be inspected and maintained.	SOIL_DISTURBANCE; GROUNDWATER; NON-RESIDENTIAL; LNDFLL_COVER_MNT	MASTER PLAN
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Previous Inspection		Comments
Were any problems or deficiencies noted during the previous Inspections?	NO	

Property Use		Comments
What is the current property use within controlled area?		Parking lot and remains government owned
Does the property use comply with the applicable LUCs?	YES	Non-residential federally owned
Has the property use changed since last inspection?	NO	
Have any changes to ownership or occupancy changes since the last inspection?	NO	
If property has transferred to a new owner, does the new deed include the LUCs?		

Institutional Controls		Comments
Do the institutional controls contain appropriate language?	YES	
Does the installation have an adequate construction review process that identifies if the site has LUCs?	YES	
Have there been any known instances of LUC breaches?	NO	

Current Inspection		Comments
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Have any problems or deficiencies related to the restrictions and/or controls listed in Section A been identified since the last inspection and/or during this inspection? This includes the obtaining of proper permits and approvals for well installation, digging, etc., and the proper disposal of contaminated soil, groundwater or other media?	NO	
Has emergency digging (or other emergency waiving of LUCs) been required in restricted areas since the last inspection? If so, were the required follow-up notifications made?	NO	A sewer replacement project was performed in 2013 and all required notifications and monitoring was done.
Are there any signs of general site deterioration that may lead to a potential deficiency in the future?	YES	Standard wear has been noted which may eventually lead to deterioration of the cover. Routine maintenance should mitigate.
Is adjacent property development activity occurring that could impact the LUC?	NO	

Conclusion		Comments
Have all problems or deficiencies identified during this inspection been corrected?		



## LUC TRACKER REPORT

### LAND USE CONTROL INSPECTION SHEET

COMMAND: MIDWEST

Remedial Project Manager: Van Donsel, Terese

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Event: LUC 13 - Site 2 Aug 2013

#### Site Information

Base: GREAT\_LAKES\_NSTC  
NORM Site ID: SITE 00002  
Installation / Activity: SITE 00002  
Type of Site: ERN  
Ownership: U.S. Navy  
Inspection Date: Aug 15, 2013 9:50:06 AM  
Inspector: Hickey, Howard  
NAVFAC MW EV  
8476882600  
howard.hickey@navy.mil

Remedial Action Objective	LUC	Implementation
A landfill cover at the site prevents exposure to contaminated soil and reduces infiltration of groundwater. This cover will be inspected and maintained.; Groundwater use restricted; Prohibits disturbance of surface or subsurface soil, unless prior written approval of the Navy and lead regulatory agency is obtained.; Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.	LNDFLL_COVER_MNT; GROUNDWATER; SOIL_DISTURBANCE; NON-RESIDENTIAL	ANNUAL CERTIFICA
Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.	NON-RESIDENTIAL	CAPPED

Groundwater use restricted; A landfill cover at the site prevents exposure to contaminated soil and reduces infiltration of groundwater. This cover will be inspected and maintained.; Prohibits disturbance of surface or subsurface soil, unless prior written approval of the Navy and lead regulatory agency is obtained.; Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.	GROUNDWATER; LNDFLL_COVER_MNT; SOIL_DISTURBANCE; NON-RESIDENTIAL	MASTER PLAN
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Previous Inspection		Comments
Were any problems or deficiencies noted during the previous Inspections?	NO	

Property Use		Comments
What is the current property use within controlled area?		Industrial, Navy property; closed landfill
Does the property use comply with the applicable LUCs?	YES	Industrial, Navy property; closed landfill
Has the property use changed since last inspection?	NO	
Have any changes to ownership or occupancy changes since the last inspection?	NO	
If property has transferred to a new owner, does the new deed include the LUCs?	NO	

Institutional Controls		Comments
Do the institutional controls contain appropriate language?	YES	
Does the installation have an adequate construction review process that identifies if the site has LUCs?	YES	
Have there been any known instances of LUC breaches?	NO	

Current Inspection		Comments
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Have any problems or deficiencies related to the restrictions and/or controls listed in Section A been identified since the last inspection and/or during this inspection? This includes the obtaining of proper permits and approvals for well installation, digging, etc., and the proper disposal of contaminated soil, groundwater or other media?	NO	
Has emergency digging (or other emergency waiving of LUCs) been required in restricted areas since the last inspection? If so, were the required follow-up notifications made?	NO	
Are there any signs of general site deterioration that may lead to a potential deficiency in the future?	NO	
Is adjacent property development activity occurring that could impact the LUC?	NO	

Conclusion		Comments
Have all problems or deficiencies identified during this inspection been corrected?		

## Site 2 Annual LUC Compliance Certificate

Forrestal Landfill

EPA I.D. No. IL7170024577

Illinois EPA No. 0971255004

Property Owner: Dept. of Navy, NAVFAC Midwest EV

Property Address: Naval Station Great Lakes

Is evaluation for all or a portion of the Site 2 property?\* All

\*If evaluating only a portion of the site, attach a figure identifying the portion being evaluated.

This evaluation covers the period from July 2012 to July 2013.

### Certification Checklist

	In Compliance	Non-Compliance	See Comment
1) Parcel not being used for residential use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) No excavation or uncontrolled removal of Site soil (unless previously approved by Illinois EPA and the Navy).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) No groundwater being used for human consumption or other purposes.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Landfill cover in good condition; no gullies, rills, or other erosion.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) No tampering with or damage to any Navy wells or remediation systems.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Landfill properly vegetated.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Presence of invasive, deep rooted species.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) Gas vent rotary ventilator in working order and spinning freely.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) No damage to site fence or unauthorized access to the site.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I, the undersigned, hereby certify that I am an authorized representative of the above-named property owner and that the above-described Land Use Controls have been complied with for the period noted. Alternately, any known deficiencies and owner's completed or planned actions to address such deficiencies are described in the attached Explanation of Deficiency(ies).

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Date: 2013.08.15 09:50:49 -05'00'

Signature

Date

Mail completed form(s) to Illinois EPA.



## LUC TRACKER REPORT

### LAND USE CONTROL INSPECTION SHEET

COMMAND: MIDWEST

Remedial Project Manager: Van Donsel, Terese

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Event: LUC 12 - Site 3 Aug 2013

#### Site Information

Base: GREAT\_LAKES\_NSTC  
NORM Site ID: SITE 00003  
Installation / Activity: SITE 00003  
Type of Site: ERN  
Ownership: U.S. Navy  
Inspection Date: Aug 15, 2013 9:37:59 AM  
Inspector: Hickey, Howard  
NAVFAC MW EV  
8476882600  
howard.hickey@navy.mil

Remedial Action Objective	LUC	Implementation
Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.	NON-RESIDENTIAL	EXPOSURE BARRIER
A landfill cover at the site prevents exposure to contaminated soil and reduces infiltration of groundwater. This cover will be inspected and maintained.; Groundwater use restricted; Prohibits disturbance of surface or subsurface soil, unless prior written approval of the Navy and lead regulatory agency is obtained.; Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.	LND FLL COVER_MNT; GROUNDWATER; SOIL_DISTURBANCE; NON-RESIDENTIAL	MASTER PLAN

Prohibits disturbance of surface or subsurface soil, unless prior written approval of the Navy and lead regulatory agency is obtained.; Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.; A landfill cover at the site prevents exposure to contaminated soil and reduces infiltration of groundwater. This cover will be inspected and maintained.; Groundwater use restricted	SOIL_DISTURBANCE; NON-RESIDENTIAL; LNDFLL_COVER_MNT; GROUNDWATER	ANNUAL CERTIFICA
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Previous Inspection		Comments
Were any problems or deficiencies noted during the previous Inspections?	NO	

Property Use		Comments
What is the current property use within controlled area?		Industrial - Navy owned and controlled property. Fenced landfill no other activities.
Does the property use comply with the applicable LUCs?	YES	Industrial - Navy owned and controlled property. Fenced landfill no other activities.
Has the property use changed since last inspection?	NO	
Have any changes to ownership or occupancy changes since the last inspection?	NO	
If property has transferred to a new owner, does the new deed include the LUCs?	NO	

Institutional Controls		Comments
Do the institutional controls contain appropriate language?	YES	
Does the installation have an adequate construction review process that identifies if the site has LUCs?	YES	
Have there been any known instances of LUC breaches?	NO	

Current Inspection		Comments
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Have any problems or deficiencies related to the restrictions and/or controls listed in Section A been identified since the last inspection and/or during this inspection? This includes the obtaining of proper permits and approvals for well installation, digging, etc., and the proper disposal of contaminated soil, groundwater or other media?	NO	
Has emergency digging (or other emergency waiving of LUCs) been required in restricted areas since the last inspection? If so, were the required follow-up notifications made?	NO	
Are there any signs of general site deterioration that may lead to a potential deficiency in the future?	NO	
Is adjacent property development activity occurring that could impact the LUC?	NO	

Conclusion		Comments
Have all problems or deficiencies identified during this inspection been corrected?		



LUC TRACKER REPORT  
 LAND USE CONTROL INSPECTION SHEET  
 COMMAND: MIDWEST  
 Remedial Project Manager: Van Donsel, Terese

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Event: LUC 18 - Sites 1 and 4 Aug 2013

Site Information

Base: GREAT\_LAKES\_NSTC  
 NORM Site ID: SITE 00001, SITE 00004  
 Installation / Activity: SITE 00001, SITE 00004  
 Type of Site: ERN  
 Ownership: U.S. Navy  
 Inspection Date: Aug 15, 2013 10:08:40 AM  
 Inspector: Hickey, Howard  
 NAVFAC MW EV  
 8476882600  
 howard.hickey@navy.mil

Remedial Action Objective	LUC	Implementation
Prohibits invasive activities within the boundaries of landfills and/or disposal areas, unless prior written approval of the Navy and lead regulatory agency is obtained.; Groundwater use restricted; A landfill cover at the site prevents exposure to contaminated soil and reduces infiltration of groundwater. This cover will be inspected and maintained.; Prohibits construction and/or operations from interfering with ongoing monitoring and/or assessment and/or remediation being conducted by or for federal, state, or local regulatory agencies, unless specifically approved by the lead regulat; Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.	INVASIVE_ACTIVIT; GROUNDWATER; LNDFLL_COVER_MNT; NON- INTERFERENCE; NON- RESIDENTIAL	ANNUAL CERTIFICA

Prohibits invasive activities within the boundaries of landfills and/or disposal areas, unless prior written approval of the Navy and lead regulatory agency is obtained.; A landfill cover at the site prevents exposure to contaminated soil and reduces infiltration of groundwater. This cover will be inspected and maintained.	INVASIVE_ACTIVIT; LNDFLL_COVER_MNT	EXPOSURE BARRIER
A landfill cover at the site prevents exposure to contaminated soil and reduces infiltration of groundwater. This cover will be inspected and maintained.; Prohibits construction and/or operations from interfering with ongoing monitoring and/or assessment and/or remediation being conducted by or for federal, state, or local regulatory agencies, unless specifically approved by the lead regulat; Groundwater use restricted; Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.; Prohibits invasive activities within the boundaries of landfills and/or disposal areas, unless prior written approval of the Navy and lead regulatory agency is obtained.	LNDFLL_COVER_MNT; NON-INTERFERENCE; GROUNDWATER; NON-RESIDENTIAL; INVASIVE_ACTIVIT	MASTER PLAN

Prohibits invasive activities within the boundaries of landfills and/or disposal areas, unless prior written approval of the Navy and lead regulatory agency is obtained.; A landfill cover at the site prevents exposure to contaminated soil and reduces infiltration of groundwater. This cover will be inspected and maintained.; Prohibits construction and/or operations from interfering with ongoing monitoring and/or assessment and/or remediation being conducted by or for federal, state, or local regulatory agencies, unless specifically approved by the lead regulat; Prohibits residential use in certain areas, unless prior written approval of the Navy and lead regulatory agency is obtained.; Groundwater use restricted	INVASIVE_ACTIVIT; LNDFLL_COVER_MNT; NON- INTERFERENCE; NON- RESIDENTIAL; GROUNDWATER	LOCAL PERMIT
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Previous Inspection		Comments
Were any problems or deficiencies noted during the previous Inspections?	NO	

Property Use		Comments
What is the current property use within controlled area?		Navy Golf Course and landfill
Does the property use comply with the applicable LUCs?	YES	Area still a Golf Course
Has the property use changed since last inspection?	NO	
Have any changes to ownership or occupancy changes since the last inspection?	NO	
If property has transferred to a new owner, does the new deed include the LUCs?	NO	

Institutional Controls		Comments
Do the institutional controls contain appropriate language?	YES	
Does the installation have an adequate construction review process that identifies if the site has LUCs?	YES	

Have there been any known instances of LUC breaches?	NO	
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Current Inspection		Comments
Have any problems or deficiencies related to the restrictions and/or controls listed in Section A been identified since the last inspection and/or during this inspection? This includes the obtaining of proper permits and approvals for well installation, digging, etc., and the proper disposal of contaminated soil, groundwater or other media?	NO	
Has emergency digging (or other emergency waiving of LUCs) been required in restricted areas since the last inspection? If so, were the required follow-up notifications made?	NO	
Are there any signs of general site deterioration that may lead to a potential deficiency in the future?	NO	
Is adjacent property development activity occurring that could impact the LUC?	NO	

Conclusion		Comments
Have all problems or deficiencies identified during this inspection been corrected?		

## LUC Compliance Certificate

Site 1 - Golf Course Landfill and Site 4 - Fire Fighting Training Unit

EPA I.D. No. IL7170024577

Illinois EPA No. 0971255004

Property Owner: Navy, NAVFAC Midwest, Environmental

Property Address: Naval Station Great Lakes

Is evaluation for all or a portion of the Sites 1 and 4 property? Yes

\*If evaluating only a portion of the site, attach a figure identifying the portion being evaluated.

This evaluation covers the period from **July 2012 through July 2013**.

Form shall be submitted within 60 days following the reporting period.

### Certification Checklist

	In Compliance	Non-Compliance	See Comment
1) Parcel not being used for residential use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) No excavation or uncontrolled removal/disturbance of Site soil greater than 18 inches in depth (unless previously approved by Illinois EPA and the Navy). No placement of fill material unless previously approved by the Navy.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) No groundwater being used for human consumption or other purposes.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Cover in good condition; no gullies (6 inches in depth or greater), rills, or other erosion.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) No tampering with or damage to any Navy wells or remediation systems.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Landfill properly vegetated (no bare area greater than 100 square feet).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Presence of invasive, deep rooted species.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) Rip rap in Skokie Ditch in good condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) Grouted piping at a manhole in good condition.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10) No unauthorized access to the site.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11) Litter Control.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I, the undersigned, hereby certify that I am an authorized representative of the above-named property owner and that the above-described Land Use Controls have been complied with for the period noted. Alternately, any known deficiencies and owner's completed or planned actions to address such deficiencies are described in the attached Explanation of Deficiency(ies).

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Date: 2013.08.15 10:01:58 -05'00'

Signature

Date


Mail completed form(s) to Illinois EPA.

## **Appendix D**

### **Photograph Log**



## PHOTOGRAPHIC LOG

<b>Client Name:</b> Department of the Navy		<b>Site Location:</b> Naval Station Great Lakes	<b>Project No.</b> 60274656
<b>Photo No.</b> <b>1</b>	<b>Date:</b> 9/20/12		
<b>Direction Photo Taken:</b>  South			
<b>Description:</b>  Engineered barrier in LUC 11, former Bldg 105, Site 22			

<b>Photo No.</b> <b>2</b>	<b>Date:</b> 9/20/12	
<b>Direction Photo Taken:</b>  North		
<b>Description:</b>  Cracks in engineered barrier near monitoring wells and abandoned ERH probe locations. LUC 11, former Bldg 105, Site 22		





<b>Photo No.</b> <b>7</b>	<b>Date:</b> 9/20/12	
<b>Direction Photo Taken:</b>  East		
<b>Description:</b>  Vegetated cover and cart path in Site 1 Golf Course Landfill		

<b>Photo No.</b> <b>8</b>	<b>Date:</b> 9/20/12	
<b>Direction Photo Taken:</b>  East		
<b>Description:</b>  Vegetated slope and maintenance area in Site 4 Fire Fighting Training Unit		